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FEBRUARY 1983 Vol II. No 3



Sci-fi rapping

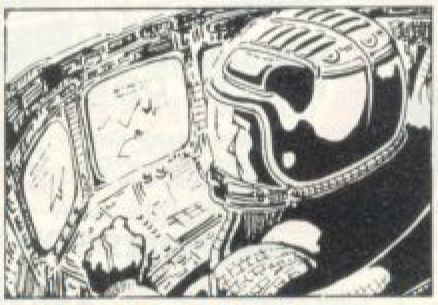
Communicating with aliens is not always as easy as: "Me Elliott, you E.T." David Langford challenges you not to alienate the aliens as they swarm into the atmosphere above you uncertain whether to make friends or attack.

We take you through the sci-fi precedents and offer a listing on page 24.

Befriend an alien today. Star Wars only had one empire, we've got seven and inter-space conflict is breaking out on page 86. This unique competition/game will be running for many months to come, with a new winner every issue. It may be too late for you to take part in February but there's nothing to stop you joining in Seventh Empire for March.

News & Reviews

Listings







Features

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NEXT MONTH

Hot-on-the-heels of the Book of Games comes our Book of Reviews in the March issue.

Our next issue boasts a free give-away guide to all kinds of computer games, who supplies them and how they compare.

We have sections on adventure games, chess, draughts, othello and backgammon games, arcade maze games, space attack games, novelty games and many more.

There's expert advice on how to choose the particular type of game you are interested in, what you should be looking for and what standards to expect.

For those of you unfamiliar with particular games, we have devoted a page to explaining the differences between Donkey Kong and Frogger, how to recognise a Galaxian when you see one and how to tell whether a Pacman ghost is edible or not.

Each cassette or disc reviewed is marked in our usual three categories, Getting Started, Value and Playability and if it scores three 10s you know our judges have been suitably impressed.

It all adds up to the most striking work yet on games software and it's free inside every copy of *Computer & Video Games*.

All you Seventh Empire competitors will need our March issue to check on your new position in the Seventh Empire game.

You might have proved to be the best fleet commander in the galaxy and earned yourself a Colour Genie on the way.

But even if you work out your score to be well behind the leaders, keep your fleets on the move in March there's still plenty of time to catch up.

Among our top games for March will be: a version of Donkey Kong — featuring Mario the carpenter and an escaped gorilla; Digger will ask you to dig a hole and trap a rampaging alien; there's Skiing, Rockfall and Dr Who Adventure.

WHAT'S BUGGIN' YOU?



Not getting a regular copy of *Computer & Video Games* eh! How do you expect your micro to work proper if you aren't reading the magazine every issue? And you with a nice little computer like that too.

Of course, I can't promise that if you had a regular copy of *C&VG* on order, your rampack would mysteriously stop wobbling overnight . . . but who can tell eh . . .

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Confessions of a Bug

So you think it's easy being a Bug huh? Well you should try sneaking a dodgy listing past the *Computer & Video Games* testers.

The month of January tho', we didn't do too bad. Mal Function managed to pull a whole host of lines out of the ZX81 game Curse of the Aztec Tomb (shown below).

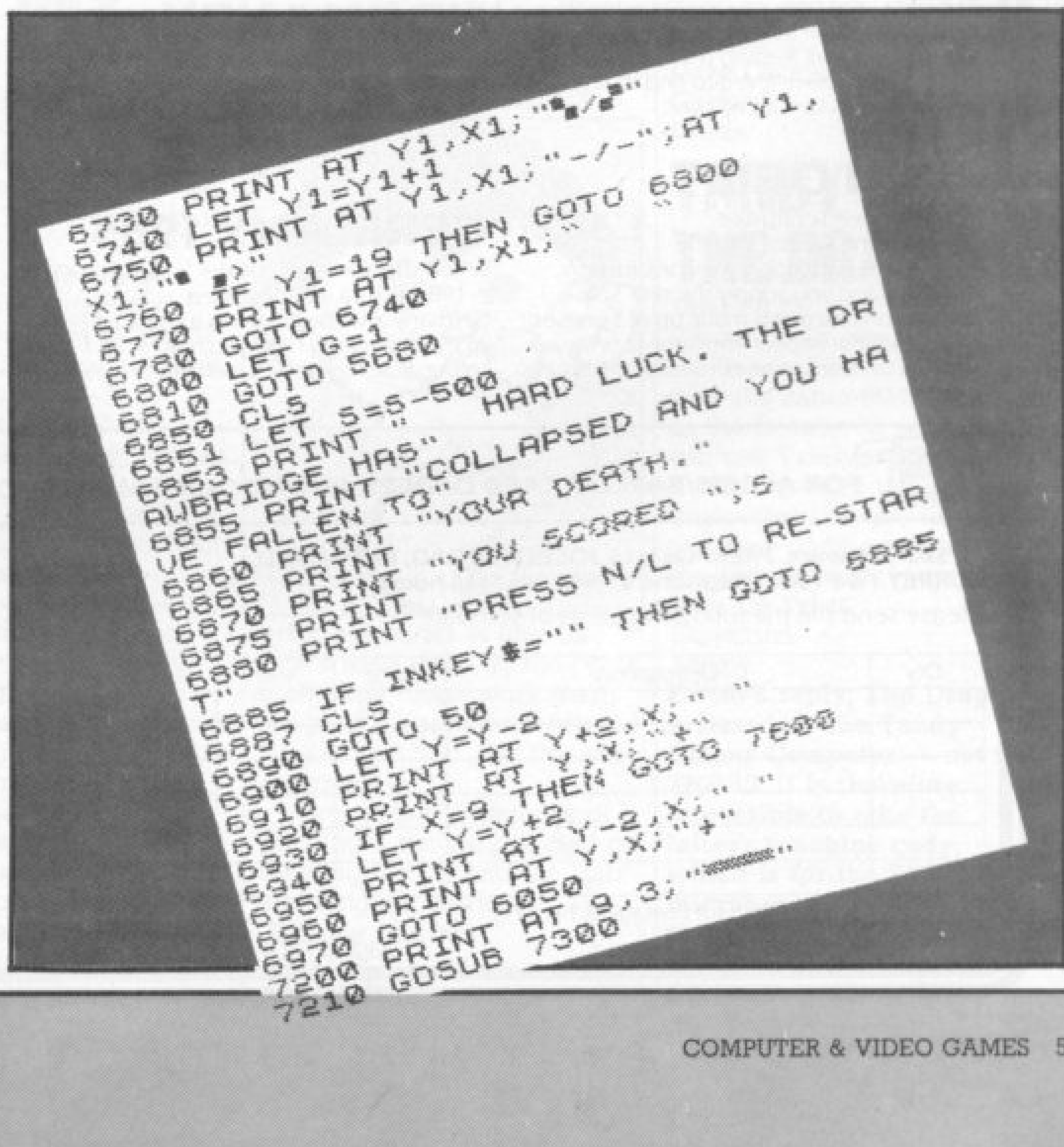
On Cave Flight most of you managed to spot the two arrow errors. In line 2040 the arrow should point left. In line 2515 the arrow should point right.

Dragon problems are fixed by:

250 IF INKEY$="" THEN 250

150 CLSO: CLEAR 200: FOR I=0 TO 448 STEP 32: PRINT @ I, CHR$(245);: PRINT @ I+31, CHR$(250): NEXT 1 : PRINT @ 0, STRING$(32,255);

330 FOR 1=65 TO 161 STEP 32: PRINT @ I, STRING$(30,(143+(I−1)/2));; NEXT I : RETURN



```
6730 PRINT AT Y1,X1;"▘▖/▗▝";AT Y1,
6740 LET Y1=Y1+1
6750 PRINT AT Y1,X1;"-/-";AT Y1,
X1;"▗ ▖>"
6760 IF Y1=19 THEN GOTO 6800
6770 PRINT AT Y1,X1;"
6780 GOTO 6740
6800 LET G=1
6810 GOTO 5680
6850 CLS
6851 LET S=S-500
6853 PRINT "   HARD LUCK. THE DR
AWBRIDGE HAS"
6855 PRINT "COLLAPSED AND YOU HA
VE FALLEN TO"
6860 PRINT "YOUR DEATH."
6865 PRINT
6870 PRINT "YOU SCORED ";S
6875 PRINT
6880 PRINT "PRESS N/L TO RE-STAR
T"
6885 IF INKEY$="" THEN GOTO 6885
6887 CLS
6890 GOTO 50
6900 LET Y=Y-2
6910 PRINT AT Y+2,X;" "
6920 PRINT AT Y,X;"+"
6930 IF X=9 THEN GOTO 7000
6940 LET Y=Y+2
6950 PRINT AT Y-2,X;" "
6960 PRINT AT Y,X;"+"
6970 GOTO 6050
7200 PRINT AT 9,3;"▀▀▀▀▀▀▀▀"
7210 GOSUB 7300
```



Please drop us a line at: Computer and Video Games, EMAP, Durrant House, 8 Herbal Hill, London EC1R 5JB.

SPECTRUM OUTBURST

Dear Sir,
I really must reply to Mr McAuley's extraordinary outburst on the Sinclair Spectrum.

The fault record of previous Sinclair machines was truly deplorable. A number of my friends and colleagues have had them. All have had problems and one tells me that the ZX81 he bought in April this year has been back to Sinclair four times so far. It has been in his hands for only seven weeks so far.

The Spectrum may be better; so few have been cleared so far that we cannot judge.

Sinclair machines are presumably meant for entertainment only. The Basic used is both limiting and limited with a consequent effect on possible programs.

Judging by the reaction of my nine-year-old son, who has used a friend's Spectrum, it is outgrown within three months. £215 for a three month toy is expensive by my standards.

Most adults are prevailed upon to buy a micro with two distinct arguments: (a) to assist in the education of their children.
(b) to use themselves for serious work.

What serious work could be done on a Spectrum? A payroll — for maybe twenty employees? Stock control for perhaps fifty item lives and five movements each per week? Word processing is out, without CP/M compatibility.

As for his penultimate paragraph, is he really telling us that Sinclair computers compete with the likes of IBM, Canon, Burroughs etc? Indeed, Sinclair manufactured calculators in the past, and micros now, but I was not aware that Sinclair make or have ever made computers?

"ITV is the best in the world!" I have live in Germany, France, Italy, Canada, Australia and the USA. With the exception of much native USA product, all these countries produce first class TV programmes.

If I had only £300 to spend I don't think I'd buy either any Sinclair product or the Beeb.

I think I'd go for the Genie II — a much underrated machine. As it is, I spent rather more on a 64K machine nearly a year ago, with not the faintest sniff of a breakdown so far. Good for games, and with CP/M, equally so for business.

Lastly, "Methinks, thou dost protest too much" Mr McAuley!
R. H. Hill,
Woodford Green,
Essex.

BBC IS THE BEST, OK?

Dear Sir,
I have just read Alan McAuley's letter in your December issue with disbelief. Has he actually used a BBC Micro? I doubt it very much.

For all those Spectrum owners, who, mistakenly, think the Spectrum is "better" than the BBC Micro: just look at the facts.

Spectrum good points: Syntax check on entry, cheap price.

Spectrum bad points: Slow BASIC (3-5 times slower than the BBC Micro).

Poor quality sound (the BBC Micro has four sound channels with full ADSR control). High resolution graphics poor. Keyboards extremely difficult to type fast on (BBC Micro has a very good keyboard). Keyboard system a waste of time: up to six key presses needed for some functions! (Anyway, most BBC Basic commands can be abbreviated).

Note that I haven't mentioned the BBC Micro's built-in assembler, the flexible Mode system for choosing screen format, the superb extended Microsoft Basic or the brilliant software available: just look closely at the Acornsoft range.

I hope this letter has finally shown to all those Spectrum owners that the BBC Micro is the best home computer in the world.
Richard K. Lloyd,
Wirral,
Merseyside.

ICE VENDOR VINDICATED!

Dear Sir,
With reference to *Computer and Video Games* issue number 13 — November 1982. I am writing to complain about the Pet/Apple program, Ice Cream Vendor. Line 10 reads:
VTAB 10: PRINT TAB (10) "*********************"

I was putting the program in our Pet computer at school when after the 19 we listed the program and a syntax



error appeared in line 10.

We tried deleting the "v" in it and that didn't work then we tried a space between the "v" and the "tab" but that still didn't work.

After about 10 minutes of puzzling it out we decided on deleting the "v" and the "tab" and Bingo! it worked!
Andrew Gardner,
Shanklin,
Isle of Wight.

ALIEN CHASE AMENDMENTS

Dear Sir,
Many thanks for the excellent standard of games in your magazine. I haven't typed in a bad one yet!

However, the December issue BBC game Alien Chase could give those of us with issue 1 (etc) operating systems some trouble.

In order to retain the features of the game, 2 changes need to be made:

```
50 VDU 23;10,32;0;0;0;
110 IF INKEY(-99) THEN
I%=226 ELSE IF
INKEY(+122) THEN I%=249
ELSE IF INKEY (-26) THEN
I%=153
```

This does the trick and the game proceeds as designed. I have also written an amendment for joysticks:

```
110 IF (ADVAL(0)AND3)=1
I%=226 ELSE IF
ADVAL(1)<21000 I%=249
ELSE IF ADVAL (1)>44000
I%=153
```

Dave Carlos,
Garforth,
Leeds.

TANDY AND THE DRAGON

Dear Sir,
Please could you tell me if the Tandy TRS-80 machines uses the same machine code as the Dragon 32 and if you can use Tandy games on it? If there are any other computers that use the same machine code could you tell me about them.
John De Sylva,
Guildford,
Surrey.

Editor's reply: The Dragon is based on the Tandy Colour Computer — not the TRS-80. It is therefore impossible to take the latter's machine code, which is for the Z80 microprocessor, and use it on the Colour Computer/ Dragon 32, which has the 680S processor.

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MAILBAG



SEARCH FOR SOFTWARE

Dear Sir,
Having bought a Dragon 32 micro-computer I have found that up to now there has been a lack of available software for it.

I have heard, however, that because it uses microsoft basic it is possible to use software from the Tandy Colour Computer and the BBC computer. Is this correct?

And will you be featuring the programs for the Dragon in the near future? Keep up the excellent (art) work!!
Simon Malpas,
Keyworth,
Nottinghamshire.

Editor's reply: It is possible to enter listings for programs designed for the Tandy Colour Computer with very little modification.

Although all the more popular computers claim to use Microsoft Basic, there are so many different versions that it is very difficult to translate Pet to Apple to TRS-80 to Colour Computer/Dragon 32.

The BBC does not use Microsoft Basic it uses a peculiar and unique Basic that is supposed to be compatible with Microsoft. This is rather a tenuous claim for some of the commands!!

THE DREADED DISC QUIZ

Dear Sir,
As a video games enthusiast and the proud owner of an Intellivision games console, I was delighted to find your magazine at my local newsagent and have taken it regularly ever since.

Although I do not own a micro at present and so cannot run the programs listed each month, I do get immense enjoyment from reading all the other features, i.e. Mailbag, Games News, Arcade Action and so on.

However, having said that, I have heard that Mattel do plan to launch an add-on keyboard about March of this year so there are some programming possibilities.

My main reason for writing to you is to try to find out what other people think of the Mattel system and in particular the "dreaded disc", their alternative to either joysticks or paddles as favoured by Atari, etc.

Although I find the disc reasonably easy to manage myself, most of my friends seem to disagree. Perhaps if this aversion could be got through to Mattel they may seriously consider bringing out some alternative form of control.

Finally, here is a list of my current high scores: Space Armada 500,320; Astrosmash 1,125,760; Lock'n'Chase 136,980; Space Hawk 253,890.

I would be most interested to learn if anyone can beat these or of any other high scores on Mattel games.
Marc Duffield,
Huddersfield,
Yorks.



THE BUGS ARE OUT!

Dear Sir,
One night after I had fallen asleep over my Sinclair Spectrum I was suddenly woken by cries of "Stamp on him", "Shove a club in his mouth!" Quick as a flash, I jumped up grabbed my camera and managed to get a photo of this amazing attack before they all disappeared inside my copy of *Computer and Video Games*!

Please print the photograph otherwise no-one will ever believe me.
J. Carroll,
Rishton,
Lancashire.

BACK TO THE MANUAL . . .

Dear Sir,
Please would you explain how to introduce variables into a defined function from the main body of a program for BBC Basic.
Neeraj Sharma,
Slough,
Berkshire.

Editor's reply: This is quite complex Basic programming I suggest you look at page 230 in the BBC manual.

GETTING THE CONNECTION

Dear Sir,
We have a BBC Model B at our school. We also have two printers, an Epson dot matrix printer MX80 F/T and an MX80 F/T type II which we use with our Research Machines 380Z.

I have some programs for the BBC which I require hard copies of, and as we do not yet have a BBC printer I was wondering whether either of the printers are compatible.

Could you also advise me on the best Space Invader type games for the BBC?
Martin Noakes,
Sittingbourne,
Kent.

Editor's reply: If you have a Model B computer then the Epson printers — with RS232C interfaces — should work OK; however, the socket at the rear of the BBC computer — 5-way PIN — is non-standard for RS232C. So a special cable is required. (See page 406 of manual). Centronics parallel standard is available through the parallel printer post. It all depends on your printers which standard you use.

Both of the following companies produce good Invader-type programs. Bridge Software, 36 Fernwood, Marple Bridge, Stockport. Amba Software, 13 Cherry Bounds Road, Girton, Cambridge CB3 0JT.

JOIN UP FOR ADVENTURE

Dear Sir,
A postal BBC Micro Adventure/Fantasy Club has now been formed. The club will provide a central library of Adventure and Fantasy games written by the members for the use of other members.

In this way Adventurers can find a ready group of fellow enthusiasts to share their fantastic journeys. Send an s.a.e. for further details.
BBC Micro Adventure Club,
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Larkfield,
Kent, ME20 6NR.

MYSTERIES OF THE SCROLL

Dear Sir,
Recently I have been trying to get my Vic to print random dots on the screen at random, then scroll the screen from right to left, while still printing dots at random. My attempts have been fruitless.

Please could you tell me the solution before I go mad with frustration!
J. Skelding,
Stourbridge,
West Midlands.

Editor's reply: It is easy, using the Poke instruction to get random dots on the screen. For example, using the information on pages 143/144 of the Vic instruction manual.

```
10 x = INT(RND(1)x506+1)
20 POKE 7680+×,42
30 GOTO 10
```

This will produce a random pattern of stars. I suggest you read the appropriate section of the *Vic Revealed*, by Nick Hampshire for ideas on how to scroll from left to right — it's far too complicated to explain in this small space.

Solving our earth invading puzzle

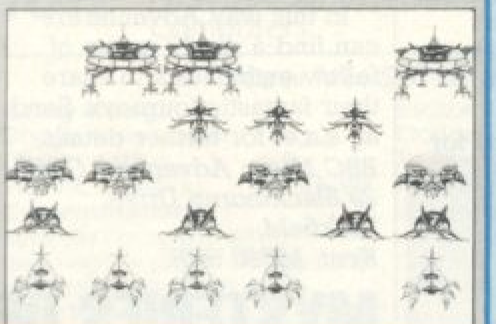
Saving the Earth from the alien hordes was the problem we set you last month and the more spirited defenders amongst you replied swiftly enough to keep our atmosphere free for eons to come.

The best solution Trevor Truran could manage was 21 shots to clear the atmosphere, or just two missed shots.

His best effort began at F and went on: A, E, B, E, C, C, D, B, F, B, C, C, F, C, A, D, A, C, D, F.

We will be publishing the winning names next month.

And Trevor's back with another Puzzling column in March.



It's the turn of space pirate Austin Cambridge to hold forth on our special C&VG computer moderated game of Starweb, which is now drawing to a close. Austin's views on the galaxies of Starweb are reported faithfully by Anthony Shepherd, below.

PIRATE WITH A HEART OF GOLD

I'm the brighter buccaneer, the Simon Templar of the Space lanes, the man in the white space helmet. I may be a Pirate King but I am a **Good Guy**. I seek out and eliminate the outposts of my arch enemies, the oppressive Berserkers.

One of these, Gzinti, has been a thorn in my flesh with his absurd threats and impudence.

Another, a former ally of mine, threatened me recently so I sent the fleets in.

I liberate the oppressed prey of Berserkers, set free those under the yoke of Empire Builders like Merchants and Artifact collectors.

And what do I take in return? I do not seek to kill populations or make people work hard on my fleets, all I ask for the liberation of the oppressed is a little piece of the boodle, a few spondulix, some wherewithal, little to ask for my services to lifekind.

It must be shown that aggression does not pay, aggressors must be punished, and I am the man capable of such a feat.

I am amassing a Task Force.

A collection of fleets, this force will be so fast that when in Battle formation it will almost blot out the most powerful of Suns.

A force so huge and powerful that Berserker robots will quail at its presence, and Apostles will pray at its coming.

This task force will be headed by myself in the flagship, A.C. Freedom-for-All ready to wage terrible war on evil-doers.

We will fight them on the Spacelanes, at the planets and near the Black Holes, there will be blood, oil, and tears, but we will never surrender . . .

There is No Alternative but to stand up and fight. The time for Diplomacy is over, the time for action is here. Fight, we will, for the elimination of Berserkers and lifekind's inexorable right to be free!

I am so cool I could fluster a Penguin, and I am so hip I have difficulty seeing over my pelvis.

Never let it be said that Austin Cambridge did not play the major role in the freedom of the Galaxy.

A GOOD HOME FOR A DRAGON

The Sorcerer's Stone has captured a Dragon for its creator.

Andy Burras of Lindle Lane, Hutton, Preston in Lancashire, is the worthy winner of the Fantasy Game Competition we set in our November issue.

He wins a Dragon 32 microcomputer on which to pursue his thirst for fantasy games. And he is also being invited down by Mitre Wargames, which judged the competition entries, to discuss putting Sorcerer's Stone into operation as a new computer moderated game format to be played commercially.

Mark Blundell, of Mitre Wargames was impressed by the high standard of entries and offers his commiserations to the unlucky entrants, but felt that Sorcerer's Stone came closest to a workable computer moderated game format. "The author had put a lot of thought into how the game could be put onto a computer," said Mark.

Sorcerer's Stone is a game for 12-15 players, who each takes control of a wizard in a tower. The aim is to capture the Sorcerer's Stones by making use of the wizard's orcish, elven and dwarvish servants and casting spells by using up power points.

The game has been well planned out for use on a computer and Mark is confident that he will be able to report on a new fully-fledged British computer-moderated game in the autumn.

A Dragon 32 will be winging its way, courtesy of Dragon Data, to Andy in Preston.

● Apologies if you are still waiting for news of our pinball competition, which was run over August and September. Bally's US Pinball Division have had a tough job sorting through the huge pile of entries we sent Stateside but Bally are announcing the winner next month to coincide with the UK Amusement Trades Exhibition. So keep your fingers crossed.



ZX Spectrum JOYSTIX ! VIC 20 SOFTWARE

FROM INTERCEPTOR MICRO'S



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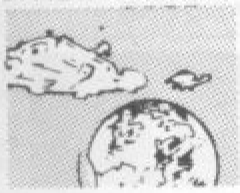
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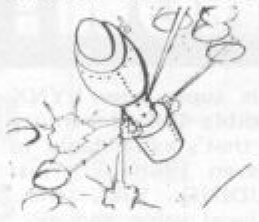


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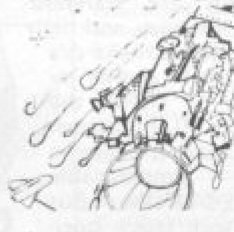
ALIEN ATTACK



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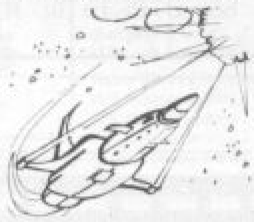
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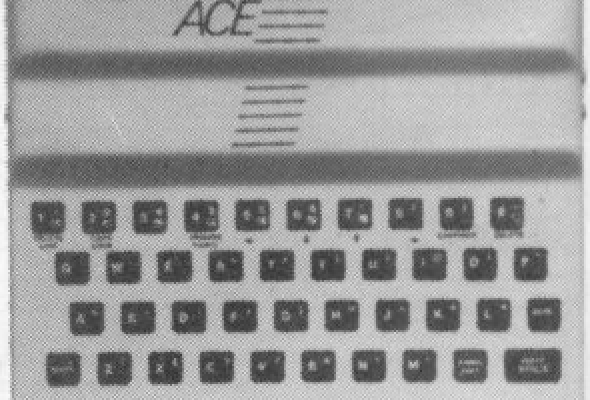
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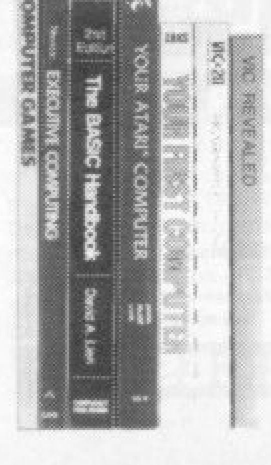
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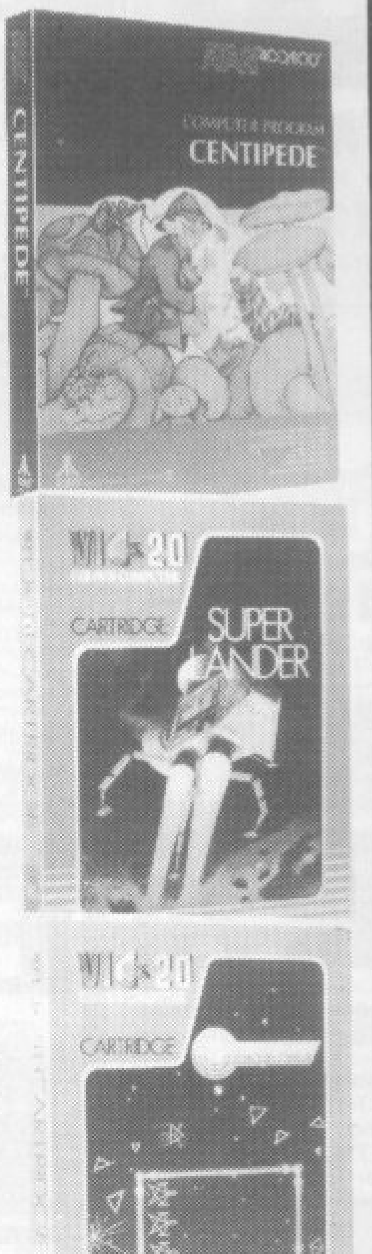
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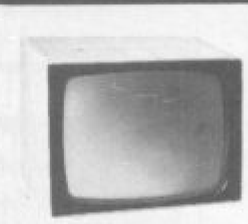
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GAMES NEWS

MYSTERY OF THE DARKLY GLOWING GEM

BLACK CRYSTAL

In order to win the Black Crystal you must first seek out the seven gold rings and place them on their pedestals — ranged in a circle around the brilliant gem.

But even before you get to see the crystal you will have to overcome dozens of dangerous challenges. The sheer number of episodes in this game make it one of the longest adventures ever written — with 12 different screen presentations.

As you pursue your adventure you have three main strengths to supplement your natural cunning. Physical strength consists of your two principal weapons, a sword and a shield.

Purity enables you to be brought back to life if you meet with a grizzly end at the claws of one of the dragons or vampires which haunt this adventure.

The spiritual strengths at your disposal are lightning and "power drain".

Black Crystal is available from Carnell Software of Slough at £7.50. The game runs on a Sinclair Spectrum in 16 and 48K and on a ZX81 in 16K.

BEWARE OF UNDERWATER ENEMIES

SUB TRACK

Sub Track is a new Spectrum version of an arcade game.

You command a destroyer being pursued by a fleet of enemy submarines. Your only defence is your depth charges which you must drop at just the right moment so that they will knock out the submarines a few seconds later as they pass below you.

Sub Track is manufactured by the new Spectrum writers — Amba Software of Cambridge.

Also in the range is an Adventure game called Treasure Hunt and a version of Pacman. The games cost £4.95.



WHEN IS A CASTLE A RIDDLE?

CASTLE OF RIDDLES

More prizes are on offer this month as the software houses compete to sell their goods.

Acorn goods worth £2,000 are up for grabs to the first person to solve the Castle of Riddles adventure for the BBC Model B.

This classic text only adventure has an added twist of humour with such gems as "What gets wet as you get dry?" Answer: a towel.

The release date of Castle of Riddles has been strictly timed so that any one who purchases the game, whether by mail order or over the counter, will have an equal chance of getting hold of the game at the same time and entering the competition.

Other exciting prizes planned for 1983 feature a number of holidays to far-away places. Most interesting of these is Automata Cartograpy's trip to the U.S. to meet a mystery celebrity whose identity is hidden away in the bits and bytes of the new Spectrum game "My Name is Adolf Hitler, You Win a Fat Cigar". Who can the celebrity be? Who will win the prize? Will this reporter be going to the U.S. to cover this momentous meeting? All will be revealed in Games News soon.

Another holiday — destination undecided — it to be put up by Carnell Software of Slough for their next adventure game which will be the sequel to the epic Black Crystal adventure.



A JOLLY MIXTURE OF FUN . . .

COMPENDIUM

That Rolls-Royce of board games, the De-Luxe Compendium is now a thing of the past as all the family favourites such as Snakes and Ladders, Ludo, Fox and Geese, Beetle, and even Noughts and Crosses can all be stored on one computer cassette.

The computer compendium has a number of advantages over the traditional board version. It is impossible to lose the counters and the dice or other essentials to play as these are safely stored away on the cassette tape.

Furthermore, in a game like Noughts and Crosses for example, you can play against the computer if you are short of another human opponent.

A games compendium for the Sinclair Spectrum in 16K has been produced by Dymond Software of Annan. It features the above five games and is available from the Dumfriesshire based firm at £4.95.

LAST REFUGE OF THE GALAXIANS

ARCADE CLASSICS

Arcade classics Galaxians and Defender are enjoying a new lease of life as games manufacturers regularly churn out versions for the popular micros.

Defender is one of the few video games to come out of the boom period of 1980-81 to be still consistently earning ten pence pieces in the local pubs and arcades.

Its paintwork is probably now a little shabby but you can be sure that wherever a Defender machine is found there is also a small group of devotees regularly rescuing the humanoids.

The bluebottle like Galaxians have not been quite so fortunate. Pushed aside by Robotrons, Burgertimes, Pacmans, and more recently Pengos — it now seems that British Rail buffets and bars are the only sure places to find a Galaxians machine these days.

Whatever the future holds for these quaint old relics of the pay-as-you-play games era you can still enjoy them as versions are now on sale for the BBC Model B, and Atari 400 and 800.

Cambridge based Acornsoft produce the games for the BBC machine — though sold under different names Planetoid is Defender and Arcadians is Galaxians.

The Atari versions are available under the original names although the retail prices are not available as we go to press.

GAMES NEWS

GO TO WORK SMASHING AN EGG!

EXTERMINATOR

If you shook with fear while watching Hitchcock's *The Birds* then you will be scared to learn that they are back. This time gunning not only for planet Earth but the entire universe!

You are charged with the mission of seeking out the birds' secret lair on the planet Dron. This is where they lay their eggs and hatch their plot of intergalactic supremacy. The only way to stop the birds is to destroy their eggs.

Exterminator is the name of the game for the TRS-80 or Video Genie. It can be purchased from Algray software at £7.95.

Also new from Algray this month is a 3D adventure game called Double Agent. You are the spy who must break in to a high security fortress and escape with top secret plans. The game comes with a money-back guarantee from the Barnsley based company at £12.95.



SURVIVAL OF THE FITTEST AMOEBA!

EVOLUTION

Experience millions of years of evolution in a few minutes in this latest game for the Apple.

Only the strong survive in Evolution — sentiments which Charles Darwin would no doubt echo.

You begin the evolutionary cycle as an amoeba swimming in a fluid of DNA cells which you must try to consume to nourish your weak one-celled life form. Spores, microbes, and antibodi are also struggling for supremacy and will fee on you if they can touch you.

If you survive the amoeba stage you then jump a few million years to become a frog. This time flies are your food source and fish your competitors.

From frog you go on to rodent, then beaver, then gorilla and finally human. The game does not end there. A final battle must be fought with the mutants followed by a nuclear war which could just spell doom for the human race.

Evolution was written by two Canadian teenagers who brought it into the offices of a Vancouver based business software house.

The firm liked it so much they decided to market it. And now the youngsters are predicted to be thousands of dollars better off by the end of 1983 according to the managing director of the company.

The game is produced by the Sydney Development Corporation — a Canadian business software firm. It is available in this country from Pete and Pam Computers at around £20.

DOWN TO THE SEA AND SKY AGAIN

SUB COMMANDER

Submarine Commander and Jumbo Jet Pilot, the two TV advertised games from Thorn EMI for the Atari 400 and 800 will shortly be available for the Texas Instruments 99/4a.

The simulation games give you a taste of flying a Jumbo and commanding a submarine in war time. Both games feature a variety of realistic controls. Submarine Commander for example challenges you to destroy all enemy shipping operating in the Mediterranean.

You have sonar to help you find them when submerged, radar, oxygen level, fuel, battery charge, depth under your keel, periscope and screen presentations of the surface and sky line, a map of the Mediterranean, and radar scanner.

The games will be on sale towards the end of January at around £30.

WIN YOUR COWBOY SPURS . . .

CHISHOLM TRAIL

TI owners can look forward to a wider choice of games in the new year as some of the smaller software houses — currently manufacturing for the Vic, Spectrum, and BBC machines — are negotiating with Texas to produce games for the 99/4a.

The latest game from Texas takes you back to the cattle trails of old Kansas with rustlers, wild steers and wranglers. For non High Chaparal fans a wrangler is a semi-legal rustler employed by a rival cattle herder to pick up the strays from your herd and then brand them with his own mark.

Chisholm Trail takes its name from the famous cattle trail between Texas and Kansas where many a cowboy earned his spurs. The aim of the game is to get your herd from Texas to Kansas with as few losses as possible.

The game is available from TI dealers now at around £22.

THE GAME OF THE BOOK OF THE FILM . . .

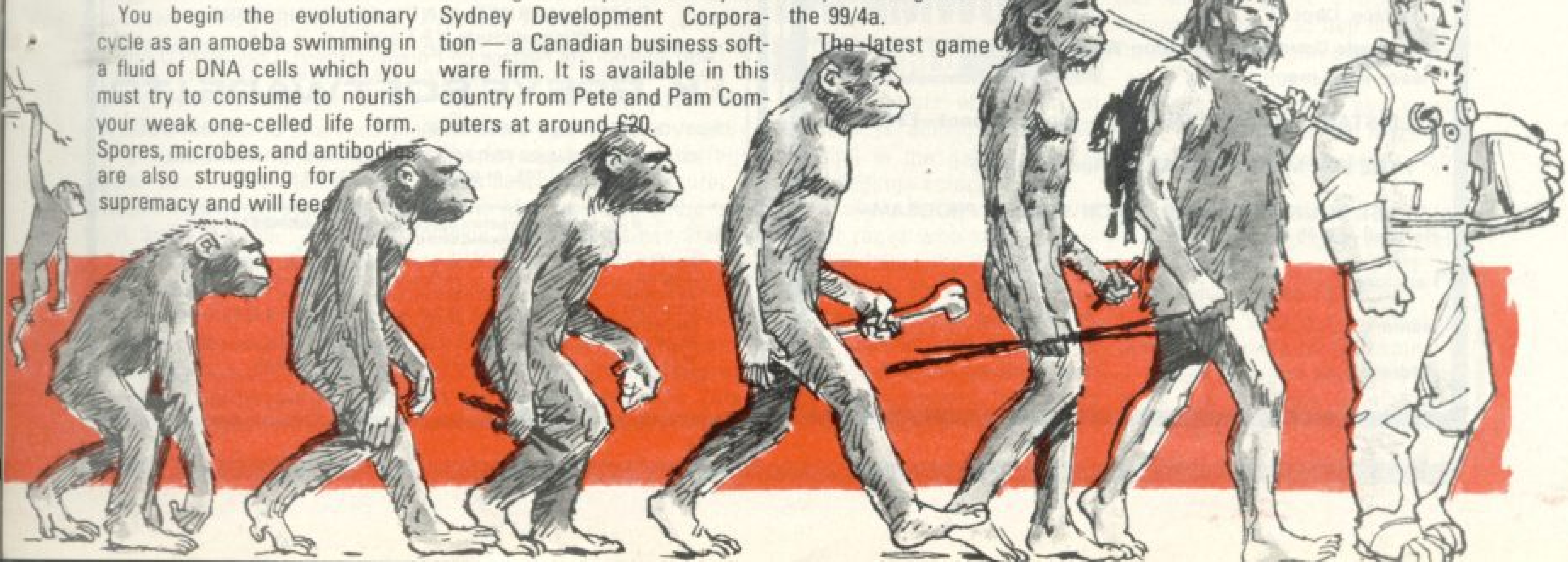
E.T.A.

The game of the film is the latest craze in computer gaming. The theory behind it is that if people will buy the book, record, T-shirt and even jig-saw puzzle of the film then why not buy the game of the film too.

The TV games centre manufacturers were the first into this profitable new business with games for current box office money spinners ET and Tron.

Hot on the heels of Atari's ET comes a version for the Spectrum in 16K and 48K from Automata of Southsea.

ET has crash-landed on Earth and has lost his memory. It's up to you to help him remember his name, and find his space craft before the wild dogs and evil military catch him. ETA is available at £5 from the Hampshire firm.



GAMESNEWS

UP, UP AND AWAY WITH SPECTRUM

FLIGHT SIMULATION

Fly the flag with this latest flight simulation from Psion Software. The game is the most sophisticated flight simulation ever produced for a micro-computer.

It represented a marathon programming excercise for the London based firm. It took over eight thousand man hours to complete with up to six programmers working on the project at any given time.

Many of the features of this flight program are straight from the cockpit of a Boeing 747.

The instrument landing system lines up a flashing dot with a cross which has been centred on the chosen airport.

All information systems are displayed as dials just as in a real plane. These tell you your altitude, rate of climb, speed, wind and weather conditions, and your position.

The game offers two screen presentations. The first of these shows the view from the cockpit with the instruments described above in the bottom of the screen and the view of the horizon in the top half of the screen. As the plane swoops down you can see land and lakes in the horizon appearing in front of you through the cockpit window.

The plane can be made to bank, roll, dive, climb and even loop the loop — though you will have to be a pretty good pilot to make it do this.

The second screen presentation shows a map with you plane flashing its rate of progress. The airports are represented as flashing beacons with the land and lakes shown.

Flight Simulation runs on a Sinclair Spectrum in 48K and is available from larger branches of W. H. Smith at £7.95.

Also new from Psion this month is a second Horace tape. The original Horace game featured the cute comic character running around a park being pursued by the attendants. They were chasing him because the mischievous little glutton had just gobbled their sandwiches and eaten their prize winning daisies.

In this second episode Horace goes ski-ing. You have to get him across a busy road to the hut where he keeps his skis. Hobble back across the road with skis on and Horace can then begin his slide down the snowy slopes. Good luck Horace! Don't fall over!

Horace Goes Ski-ing runs on a Sinclair Spectrum in 16 or 48K and is in W. H. Smith stores now, at around £6.

GAME FOR A LAUGH ON THE ZX81

GAMES PACKS

Two new games packs for the ZX81 add another thirteen games to choose from to the now enormous range of games available for the daddy of micros.

Both tapes run on the unexpanded machine in 1K.

Games Pack One features Air Sea Rescue, Invaders, Message Writer, Demon Driver, Breakout and Squash.

Games Pack Two features Jump Jockey, Asteroids, Invaders (part 2), Stunt Cycle, Noughts and Crosses, Enterprise and Sketch.

Both games are available from Database Software of Stoke-on-Trent at £4.75.

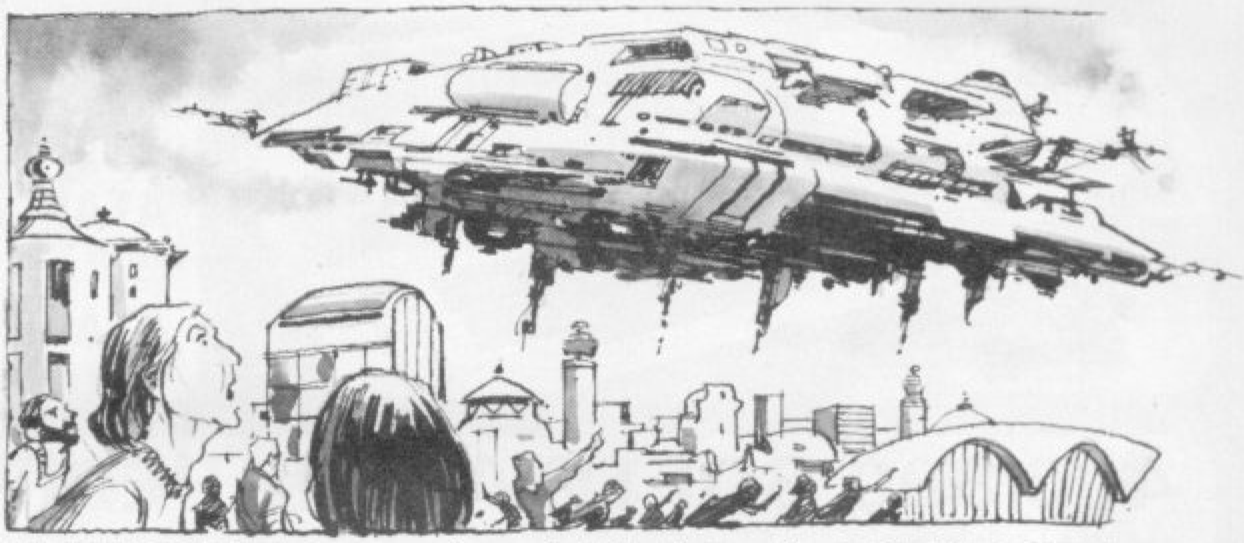


Illustration: Jon Davis

NEWCOMER MEETS OLD FAVOURITES

DRAGON GAMES

A steady trickle of new games manufacturers are beginning to sell games for the new Dragon computer.

Games Pack One — from John Morrison of Glendale Street, Leeds, is an example of some of the new software now coming available. The cassette features five well known games Othello, Awari, Moonlander, Breakout and an original game, Raffles.

Raffles is a mini-adventure game where you have to explore a honeycomb of mysterious rooms searching for treasure.

John Morrison also offers two classic adventure games Stalag, and Worlock.

The above cassettes together with another Games Pack featuring Space Invaders, Lunar Lander, and a Centipede-type game are on sale now from the Yorkshire-based firm at £5.75.

DEFENDING THE BLUE DREAMWORLD

OUTWORLD

The architecture of the city of Outworld is amongst the most beautiful in the galaxy. It's tall blue buildings scrape the sky.

The city is the envy of several inferior races who seek to destroy it and deny the Outworldians their utopian life style.

Outworld's chief weakness is that it uses up vast amounts of energy to fuel the buildings and drive the protective force field which blankets the city.

You must provide an escort for the fuel ship and also fight off attacks from hostile aliens. Each time a meteorite hits the force field, more of the city's precious supply of energy is used up.

If an enemy saucer penetrates your defences they will then be able to score a direct hit on Outworld. It only takes one bomb from a barbarian ship to destroy the civilisation.

Outworld is the latest game from Reading-based Audiogenic for the Vic-20. The game is available at £34.95.

DON'T GET CAUGHT ON THE HOP!

FROGS

Ribbit! Ribbit! Hi, my name is Frogs and I've just been hopped out of the arcades to become the latest game for the ZX81.

You can find me on the B side of the latest Psion game called Super Glooper.

Frogs is a version of the popular arcade game Frogger in which you have to hop our hero to the safety of the bank on the other side of the river.

In Super Glooper you must paint in as much of the maze as possible before the guards catch you.

Also new from Psion this month and bringing a touch of arcade action to your ZX81 is Thru the Wall and Scramble.

Thru the Wall is a version of the early arcade hit Breakout.

Super Glooper and Thru the Wall are available from W. H. Smith at £4.95.

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Silica Shop have put together a full catalogue and price list giving details of all the peripherals as well as the extensive range of software that is now available for the Atari 400/800. The Atari is now one of the best supported personal computers. Send NOW for Silica Shop's catalogue and price list as well as details on our users club.

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KNOW THE DANGER SIGNS OF PITFALL!™
This year thousands of jungle explorers will join Pitfall Harry and seek lost treasures in Pitfall!™ by Activision.® A new video game for use with the Atari® Video Computer System.™ Ultimately, thousands of jungle explorers will also fall prey to the many hazards found in Pitfall's maze.
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PRESTEL

THE SHAPE OF THINGS TO COME

Peter Linton takes a break from our Prestel page this month as DAVID BABSKY brings you up to date on a brand new and exciting development — Micronet 800.

Prestel, as you may know by now, was a marvellous idea to send constantly updated information down the phone wire.

A small adaptor was plugged into your office phone line, and it turned telephone signals into the right kind of weak electric currents which you could feed into the aerial socket of an ordinary T.V. set. And the buzzes and whistles which came down the Prestel phone wire reconstituted themselves into pictures on your screen — showing stocks and share prices, or railways timetables, or the day's latest newsflashes.

Now I'm talking about all this in the past tense, because those particular uses of Prestel are rather fading into history.

THE HOOK . . .

Prestel never really caught on with people sitting round the telly at home because static screens of information look rather boring, and there was nothing much on Prestel that you couldn't find out by simply looking in a newspaper — which is far cheaper than the £100-£150 or so which the phone-line adaptors would cost!

But now there's a new home-orientated use for the Prestel idea: instead of just sending pages of information to read off your screen — like the BBC's Ceefax, or ITV's Oracle — it's possible to send home-computer programs down the wire. And to make it cheaper for everyone to hook up to the service, British Telecom and the publishers of *Computer & Video Games*, EMAP have got together to provide a £49.95 phone-to-computer adaptor.

IN THE NET . . .

Programs will be available from January on this new service — which is called Micronet 800. "Micronet" because it'll evolve into a network for microcomputers, and "800" because that's the number which existing Prestel users tap into



their keyboard to get to the Micronet area of Prestel.

The first few hundred programs on Micronet 800 will be for the BBC A and B micros, the Apple computers, TRS-80s RML 380/480Z machines, and Commodore Pets.

Phone adaptors for these will be available straight away. And they'll be followed shortly afterwards by programs for the Sinclair machines, as Clive is due to make phone-to-Spectrum and phone-to-ZX81 adaptors available at the beginning of '83.

These adaptors are all (except for the Sinclair versions) what's called "acoustic modems" — acoustic means they operate by sound waves. So there's no direct attachment to the phone line; you just put your telephone receiver into the two plastic cups on the adaptor, and your micro and Prestel then talk to each other just like an ordinary human conversation!

This acoustic coupling cuts out the need to actually have British Telecom come round and add an extra "hard-wire" connection to your telephone system. And it also means there's no chance of any unusual voltages jumping back and forth between your computer and the phone line.

The choice of programs seems extremely varied: there'll be educational programs to use in schools and colleges, games programs similar to Pacman and space invaders and then out of the home league there'll also be business programs.

Acornsoft have put some of their BBC programs onto Micronet; Bug-Byte, Microdeal and Bridge Software are just some of the firms with ZX81 programs on the system.

These programs — and all the others from major distributors — will cost far less on Micronet than they do if you buy them in a shop or by mail-order.

There are also hundreds of free games on Micronet, and the chance to win big prizes.

C&VG has come to a deal with Micronet over games programs and any you send in for whatever micro, we will pass onto the Micronet validation team. So, as well as seeing your program published in C&VG, you'll have a chance of earning royalties from Britain's latest electronic magazine.

THE SYSTEM . . .

The whole idea of this programs-down-the-phone-line excitement came about through carefully evaluating what goes into a proper purpose-built Prestel reciever.

It has a screen — but so has a home computer. It has an alphanumeric keyboard — and so, too, does every personal computer.

Some Prestel sets, only have a numeric keyboard, and these can't be used for sending messages to other users. With a home computer you can type electronic messages to all or any other Micronet users!)

Home computers also have inbuilt memory, and cassette or disc recorders for storing information — so once a program has come down the line you can keep it for ever! Thus it was just one small logical step from using a home computer to *process* information, to using it to retrieve or receive that games-program information from a central Prestel or Micronet computer.

Incidentally, Micronet are paying a handsome 20% royalty on any programs of yours that they put on the system. Their address is Petersham House, 57a Hatton Garden, London EC1N 8JD.



A SPACE NIGHTMARE.

A fleet of hostile hamburgers appears on the screen, and the nightmare begins. Keep firing! Keep moving! Because if you get past the burgers, a school of belligerent bow ties is waiting to see what you've got.

And so it goes. Wave after wave of everyday objects come at you with increasingly difficult patterns of attack and evasion. And the better you get, the better they get.

The attack is so terrifying, you just might call it the worst thing you've ever seen on television. We call it MegaMania,™ a new video game for your Atari® Video Computer System.™ Designed by Steve Cartwright.





ACTIVISION®

WE PUT YOU IN THE GAME.

TAMING THE INVADERS

David Langford discovers that there is more than just one way to save planet Earth

Once again those vile space invaders hang in the sky. Once again they throb their evil way downward, and once again it's only your staggering marksmanship which can save Earth from being overrun.

Difficult, isn't it, to read these stirring words without suppressing a yawn? But there may be a new twist to the old game yet.

Since the days of H. G. Wells's *The War of the Worlds,* the trend in science fiction has been for our heroes *not* to zap the alien hordes on sight, but to try and establish some kind of communication.

For some strange reason games programs have lagged behind, perhaps because shooting space invaders seems more exciting, perhaps because it looks more difficult to program for communication.

We can keep the element of threat in a game of communication by remembering all those SF stories in which the tiniest misunderstanding leads to total and terrifying war.

In Joe Haldeman's novel *The Forever War,* it's just a small communication error which causes the thousand-year interstellar war between Us and Them.

A man in one of James White's stories tries to win the favour of cuddly aliens by kissing babies, but unfortunately the aliens assume that this Earthling carnivore is merely *hungry.*

Rather more subtle is *Peace* by Ian Watson, where war is provoked only when humans ask the aliens to agree to a peace treaty.

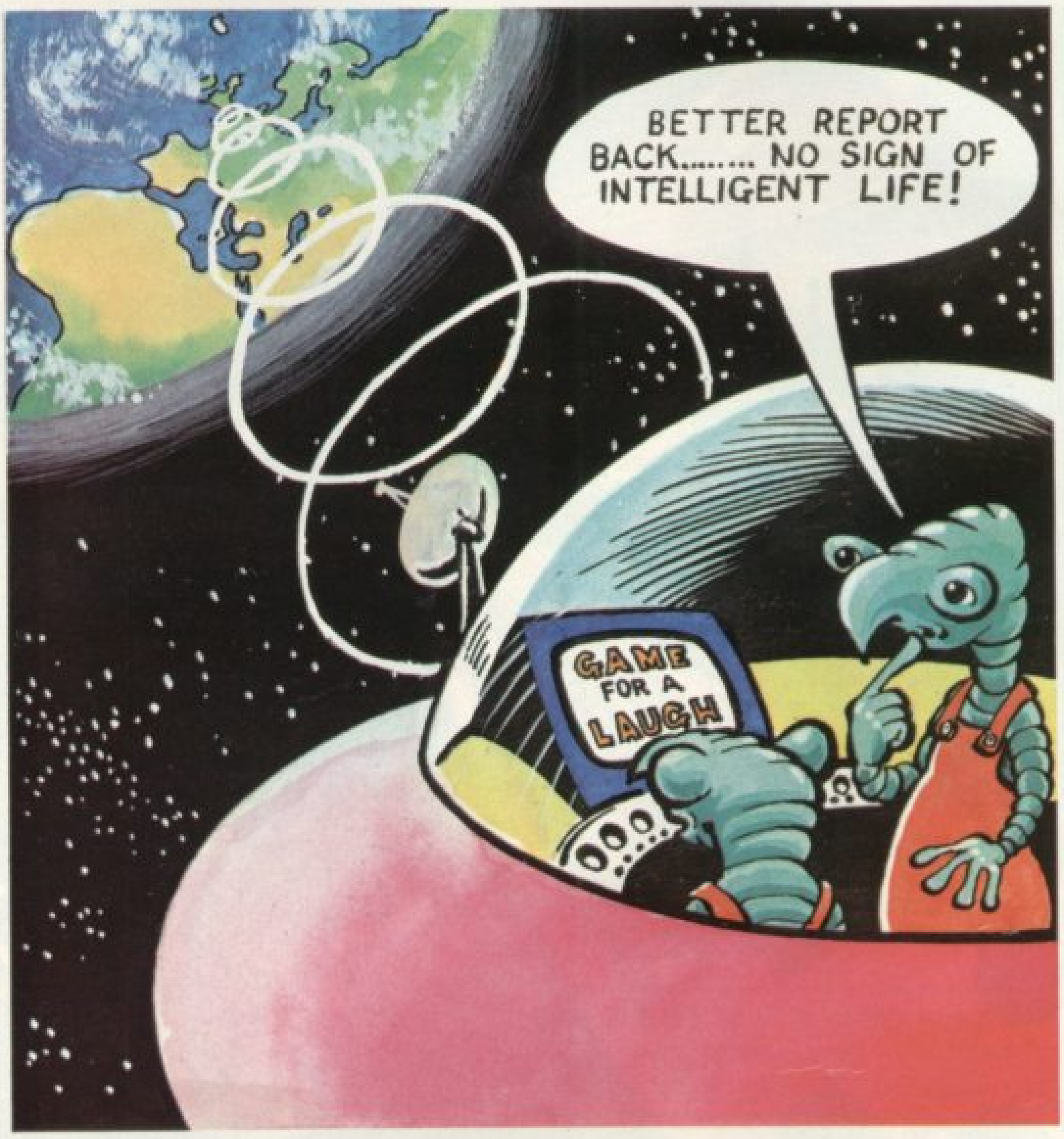
The aliens' reasoning is, roughly, "If these humans are so barbaric and obsessed with war they need a special treaty to prevent them from fighting, it is clear that they are deeply in need of extermination."

Back to the keyboard. Imagine a program scenario in which an alien fleet advances slowly on you, waiting for intelligent signals but with its patience slowly dwindling, while the only weapon you have is some means of transmitting messages — plus, of course, your own gigantic intelligence.

This is a highly realistic situation, come to think of it. These are all the weapons most of us have against such loathsome beings from beyond the outer galaxies as the Inland Revenue, the Post Office, Customs & Excise . . .

In the listing as given here, you can bash out signals to the alien horde as fast as you like. Every so often another invader joins the fleet in the skies; eventually they'll overrun you by sheer weight of numbers.

But when one of your messages is such that the aliens decide you may be



Cartoon: Terry Rogers. Illustration: Dorian Cross

intelligent, they pause and retreat a little.

If you can manage a whole *series* of "intelligent" signals to the invaders, then each successive signal will normally cause a bigger retreat until at last the sky is clear again — but a mistake may set you back to square one! It's up to you, then, to work against time and deduce what sort of simple messages can persuade the aliens to go away.

Beware: there are traps. Because aliens are deeply suspicious of mere repetition — you might only be a parrot — the same message will not work twice.

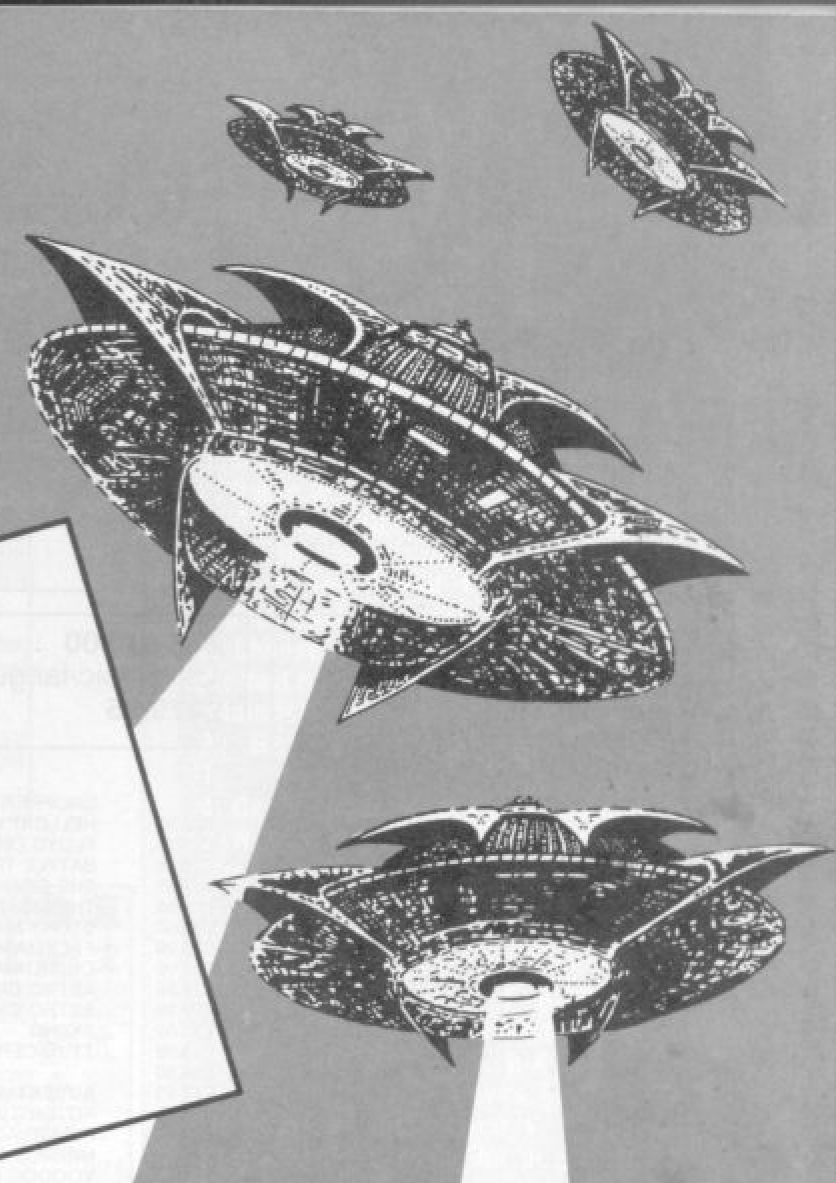
Obviously you can rewrite the program to change the type of intelligent signal for which it looks. A little study of the listing here will tell you the method used in my prototype program, though it won't help much if you want to cheat: in any case it's more fun to discover these things by playing the game than by analysing the listing.

You could easily alter the program to make the key signal a particular computer-generated key word, so the game would become something like Mastermind or Hangman played against time. Or perhaps the aliens themselves could be made to send signals, to which you have to respond, following alphabetical or mathematical sequences which you must get right? Or, ultimately, the computer could generate an artificial alien 'language' in which they talk to you, your job being to decipher enough of it to send peaceful messages back . . . but perhaps the ideas are now getting a bit ambitious for a mere micro.

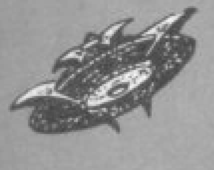
As usual, the listing is for a TRS-80, level II — but I'm buying another computer soon! As usual, you're encouraged to adapt the program to whatever other machine you may have — there are no particular subtleties.

Note that line 60 puts together the graphics for an invader. To make the game run faster, you can reduce the value of TM in line 2030 — beginners may prefer to increase TM and slow the game down. To increase the playing time — after which the aliens lose patience and swarm over you — increase the value of K in the same line.

So once again the enormous fleet of space invaders darkens the sky. Only *you* can save the Earth from being overrun. From deep in the armoured command base, you aim your mighty radio antenna and type: "Hello . . ."







```
10 ' "SPACE DYSLEXICS" copyright (C) David Langford 1982
20 RANDOM
30 CLEAR1000
40 DIMW$(25)
50 DEFINT A-Z
60 A$=CHR$(166)+CHR$(167)+CHR$(132)+STRING$(9,32)
70 B$=STRING$(12,32)
80 E$=CHR$(13)
1000 ' Game information
1010 CLS
1020 PRINT@400,"###### ALIEN CONTACT ######"
1030 PRINT@640,"THE SPACE INVADERS ARE COMING... IN PEACE?
1040 PRINT
1050 PRINT"BEAM ONE-WORD MESSAGES TO THEM (NO REPEATED LETTERS OR WORDS--
1060 PRINT"ALIENS ARE TOUCHY ABOUT THESE THINGS) AND TRY TO ESTABLISH
1070 PRINT"CONTACT  PERSUADE THEM PEACEFULLY TO GO AWAY...
1080 PRINT@0,"";
1090 FORI=1TO90
1100 PRINTA$;
1110 FORJ=1TO200:NEXT
1120 NEXTI
2000 ' Set up variables and display
2010 CLS
2020 P=0:N=0:L=0:WC=0
2030 DP=12:RP=1:K=250:TM=50
2040 Y=64+RND(26)
2050 N=Y+RND(25)
2060 IFN>90THENN=N-26
2070 NN=Y+RND(25)
2080 IFNN>90THENNN=NN-26
2090 Y$=CHR$(Y)
2100 N$=CHR$(N)
2110 NN$=CHR$(NN)
2120 PRINT@896,STRING$(64,140);
2130 PRINT"START SENDING MESSAGES NOW...",
3000 ' Update display - input letter
3010 PRINT@P,A$;
3020 P=P+DP
3030 GOSUB10000
3040 IFP>=959THEN9030
3050 FORI=1TOTM
3060 X$=INKEY$
3070 IFX$<>""THEN4010
3080 NEXTI
3090 GOTO3010
4000 ' Process message letter by letter
4010 IFX$=E$THEN5010
4020 IFX$<"A"ORX$>"Z"THEN7010
4030 IFL=10THEN7050
4040 L=L+1
4050 IFL=1THEN4090
4060 FORI=1TOL-1
4070 IFX$=T$(I)THEN7030
4080 NEXTI
4090 T$(L)=X$
4100 IFX$=Y$THENO=O+1
4110 IFX$=N$ORX$=NN$THENO=O-1
4120 PRINT@960,"TRANSMITTING: ";
4130 FORI=1TOL
4140 PRINTT$(I);
4150 NEXTI
4160 PRINTB$;B$;
4170 GOSUB10000
4180 GOTO3050
5000 ' "Transmit" and analyse complete message word
5010 IFL=0THEN7010
5020 IFL<4THEN7070
5030 WW$="":WX$=""
5040 FORI=1TOL
5050 WW$=WW$+T$(I)
5060 NEXTI
5070 J=0
5080 FORI=1TOL-1
5090 IFT$(I)<=T$(I+1)THEN5140
5100 J=1
5110 Z$=T$(I)
5120 T$(I)=T$(I+1)
5130 T$(I+1)=Z$
5140 NEXTI
5150 IFJ=1THEN5070
5160 FORI=1TOL
5170 WX$=WX$+T$(I)
5180 NEXTI
5190 FORI=1TO25
5200 IFWX$=W$(I)THEN7090
5210 NEXTI
5220 WC=WC+1
5230 IFWC>25THENWC=1
5240 W$(WC)=WX$
5250 L=0
5260 FORI=1TO10
5270 PRINT@974,WW$;
5280 FORJ=1TO30:NEXT
5290 PRINT@974,B$;
5300 FORJ=1TO30:NEXT
5310 NEXTI
5320 D=O+3:O=0
5330 ONDGOTO7130,8010,3050,6010
6000 ' Partial alien retreat on successful message
6010 FORI=1TORP
6020 P=P-DP
6030 IFP<=0THEN9000
6040 PRINT@P,B$;
6050 NEXTI
6060 RP=RP+1
6070 GOSUB10000
6080 GOTO3050
7000 ' Failure messages
7010 PRINT@960,"ILLEGAL CHARACTER";
7020 GOTO7100
7030 PRINT@960,"LETTER REPEATED";
7040 GOTO7100
7050 PRINT@960,"WORD TOO LONG";
7060 GOTO7100
7070 PRINT@960,"WORD TOO SHORT";
7080 GOTO7100
7090 PRINT@960,"REPETITION/PERMUTATION";
7100 O=0:L=0:RP=1
7110 PRINT": START AGAIN";
7120 GOTO3010
7130 RP=1
8000 ' Penalty
8010 RP=RP-1
8020 GOTO3010
9000 ' Finish - restart
9010 PRINT@0,"YOU HAVE COMMUNICATED AND MADE PEACE..."
9020 GOTO9050
9030 PRINT@0,"YOU HAVE UTTERLY FAILED TO COMMUNICATE---
9040 PRINT"AND HAVE BEEN OVERRUN BY UNCOMPREHENDING ALIENS."
9050 PRINT@960,"PRESS ANY KEY TO RESTART.";B$;
9060 X$=INKEY$
9070 IFINKEY$=""THEN9070ELSE2010
10000 ' Scorekeeper subroutine
10010 K=K-1
10020 PRINT@1013,"SCORE";K;
10030 IFK>0THENRETURN
10040 TM=1
10050 PRINT@960,"THE ALIENS' PATIENCE IS EXHAUSTED...";
10060 RETURN
```

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CHESS



Computers are well known to be weak at positional play, the intricate manoeuvring for a small advantage, such as a well-placed Knight. However, they also have problems with tactical play, even with what seems like the simple task of finding forced checkmates in positions where they are known to exist.

Look at figure one. This is an example of a "White to play and mate in two moves" problem of the kind often found in newspapers and magazines.

The first point to note here is that the specification for White to mate in two moves has no practical value. Chess problems are not game positions but artistic compositions on the 64 squares of the chessboard.

Solving a chess problem is not a matter of examining every possible sequence, but of identifying the composers' *theme* in setting the problem.

The use of a computerised "mate in two" program using exhaustive analysis sadly undercuts the aesthetic experience of problem solution.

Simply by considering every possible legal combination of two moves for White and one for Black, the program inevitably reveals the winning move. (The reader is left to discover the solution for figure 1 using either a computer or a human brain, as preferred.)

In finding checkmating sequences in positions that arise in practical play, very different methods need to be applied.

The longest variation in a checkmating sequence arising from play can easily be 7 or 8 moves (of each side) deep, so analysing every possible combination as a general solving method if completely out of the question.

On the positive side, the moves in a checkmating sequence from play are usually fairly obvious ones of a forcing nature, such as checks and captures (or sacrifices of material) whereas those in composed problems are frequently "quiet" or unlikely moves, such as a Bishop move one square further away from the scene of battle, which are difficult to perceive even for strong over-the-board players.

The MATER program of George Baylor and Herbert Simon which appeared in the mid-sixties was an early pioneering attempt aimed at finding forced checkmates in game positions, given that they are known to exist, of necessity employing "Artificial Intelligence" rather than "brute-force" means.

Figure 2 is a fairly straight-forward example of the positions solved by the first version of the program, MATER 1.

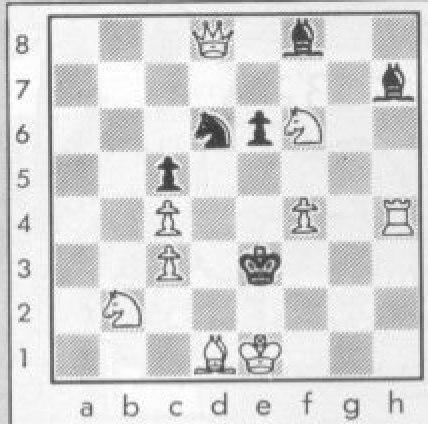
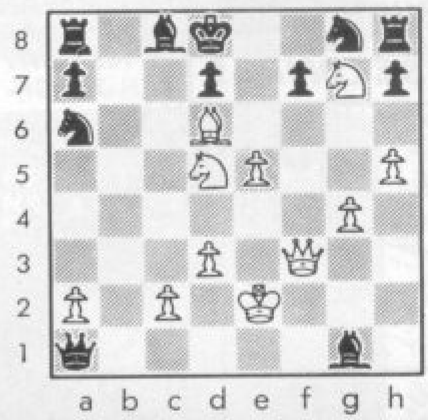


Fig. 1

Fig. 2



The major difficulties with any such program are deciding what moves to consider and in what order, and at any point in the analysis deciding what to examine next.

Deciding when to stop analysing a line is probably the hardest task of all. A badly written program might spend many hours, days, even longer, looking at variations beginning 1. P-QR3, Q-R7; 2. K-Q2, Q-R8; 3. P-R4, etc., which humans would discount at a glance.

MATER's choice of moves to examine is simple but works quite well. At any move for White (assumed to be the winning side), only checks are considered and at every White move preference is given to the check which leaves Black the fewest legal moves in reply.

As will be seen below, this may involve abandoning the current line of analysis and starting another.

Any White moves which give Black more than four legal replies are automatically discarded. Any remaining choice amonst White moves is resolved by giving priority to double checks, then to checks with no capturing replies.

When it is Black's turn to move, all legal moves must be considered, but there is a considerable advantage in looking first at those moves which are the most likely to refute White's attack.

For this reason, MATER looks first at Black moves which capture as valuable a White piece as possible. If there is still a choice, King moves get priority.

This is how MATER solves the position in figure 2.

1. Generate all White checking moves. 1. Q-B6ch has two legal replies. 1. N-K6ch has 3 and 1. B-B7ch and 1. B-K7ch each have one.

2. Choose. 1. B-K7ch (arbitrarily) from the last two for analysis, on the basis of minimising Black's replies.

3. Generate Black's forced reply 1. . . .NxB.

4. Generate all White's checking moves. 2. N-K6ch is the only one and Black has three legal replies.

5. Choose a White move to examine next from those not yet considered. Candidates are 1. Q-B6ch (two replies), 1. N-K6ch (three replies), 1. B-B7ch (one reply) and 2. N-K6ch (three replies).

The 'best' one is 1. B-B7ch so the previously played moves (1. B-K7ch, NxB) are retracted and 1. B-B7ch is played instead from the original position.

6. Black's move is again forced, 1. . . . NxB.

7. Generate White's checking moves. 2. N-K6ch (four legal replies) and 2. Q-B6ch (two replies).

8. Choose a move to consider next, from 1. Q-B6ch (two replies), 1. N-K6ch (three replies), 2. N-K6ch (four replies) and 2. Q-B6ch (two replies).

Since 1. Q-B6ch was generated first, it is chosen in preference to 2. Q-B6ch (both with two legal replies). So 1. Q-B6ch is now played in the *original* position.

9. Black now has a choice of two replies 1. . . . NxQ and 1. N-K2. The capture 1. . . . NxQ is tried first.

10. Generate White's legal moves; these include 2. B-K7 mate, which has no legal replies at all and is accordingly chosen to look at next.

11. Since 1. . . . NxQ was unsuccessful, Black's only other legal reply to 1. Q-B6ch is tried, namely 1. . . . N-K2.

12. Generates White's legal moves; these include 2. BxNch which has no legal replies and is chosen to consider next. Since it has now been found that neither 1. . . . NxQ or 1. . . . N-K2 avoids checkmate, White's winning first move is established to be 1. Q-B6ch.

Although figure 2 is quite a simple position and one that, in isolation, could have been solved by an exhaustive "mate in two" program, the same method embellished to consider other forcing moves as well as checks for White can solve many other problems for which an exhaustive search method would be completely inadequate in any reasonable amount of time.

BY MAX BRAMER


MAL FUNCTION
T. HITCH
SNAG JNR
SCREAMING FOUL UP
THE BUGS
PING!
KRUNCH!!
Remember,dear readers,in the last issue the BUG'S computer enlivened by TOTAL ANIMATION COMMANDS,leapt from the table and crashed to the floor.NOW READ ON...
I WANT THOSE PUMPS WORKING IN SEVEN SECONDS!
RUMBLE!
CRUMBLE!
RED ALERT
BINARY SNAKE CASUALTIES SHOULD REPORT TO MAIN DECK! ...
.. MAL GET DOWN TO THE LOGIC BOARD. I NEED A REPORT NOW! PUT MY MASSAGE BACK TO SEVEN. TEA AND MUFFINS FOR THREE QUICKLY.
THE ENGINES'LL NO TAKE IT CAP'N!
FIZZLE!
HELLO IS THAT ERR... B (NO T.) HITCH? IT'S ERR ... LOST MEMORY HERE. I'M IN THE LOGIC BOARD ROOM ....
..THERE'S THIS CHIP ON THE LOGIC BOARD SEE .....!
WHAT!? FOR HEAVENS SAKE LOST MEMORY, DON'T YOU KNOW THERE'S A CRISIS ON HERE?..
SIZZZLE!
.. THE COMPUTER'S WRECKED, WE MAY HAVE TO EVACUATE. AND YOU WANT TO TALK ABOUT SOME PROCESSOR YOU'VE FOUND ATTACHED TO THE LOGIC BOARD. FOR GOD'S SAKE! GET A GRIP MAN! THERE'S ....
WHUMPH!
... SUPPOSED TO BE A CHIP THERE!
LOGIC BOARD
CAT MAT SAT
THE SAT CATTED ON THE MAT.
ERROR...
10. THE MATTED ON THE CA
ERROR:
THE SAT MATTED THE CAT.
READY:

ARCADE

SAVING THE MACHINE ASSEMBLER

BLUEPRINT



What's got a machine, a monster and a beautiful maiden in distress. Blueprint — that's what.

This latest deviation on the maze-game theme is a novel new video which may pick-up some followers around the arcades once they get the hang of just what is going on.

You, the player, control a little chap known as J.J. His job is to assemble a machine which once switched on will save Daisy Damsel from the clutches of Ollie Ogre.

All J.J. has to do is collect all the parts of the machine from little houses situated in a sub-urban maze, and build them into a "blueprint" at the bottom of the screen. At the top of the screen Ollie Ogre mercilessly chases Daisy — getting closer as you play.

If J.J. enters a house more than once he comes out with more than he bargained for — a fizzing bomb. This he must get rid of before it explodes — hopefully down Ollie's monster hole situated at the bottom right hand side of the screen.

The bombs prevent Ollie's monstrous mates from engaging in the annoying habit of nipping out and bouncing up and down creating a quake which shakes your machine to bits and gives you the assembly job all over again.

There are other dangers for J.J. to overcome, Ollie's mates, Sneaky Peter and Fuzzy Wuzzy appear to chase him around the maze and prevent him completing the machine and saving Daisy.

If J.J. manages to get all the parts in the right place and gets to the machine's on switch then a deluge of beach-balls are fired at Ollie — and if he is hit the story ends happily.

All in all it's a nice game — but you'll need a good few cracks at it before you get the drift of Blueprint.

THE SEA-SCAPE WITH A 3D FEEL

SUBROC-3D

The third dimension is the current plaything which video game companies are flirting with.

Moving on from the 3D look of Zaxxon comes the 3D feel of Subroc-3D.

This space and sea warfare comes on a stand-up cabinet and a cockpit. Like Battle Zone you have to watch the game through a small binocular eye-panel which opens out onto the main screen.

You look out on a seascape filled with futuristic shipping fleets and a sky inhabited by flying saucers and speeding space ships.

The action appears to you as though you are looking through the cockpit of your Subroc fighter and the screen reacts to your tugs on two handles which pop out periscope-like from the eye-panel.

A fire button lets you reply to the barrage of fire which your ship is undergoing as all sorts of bombs and missiles are hurled towards you: torpedoes thread through the ocean while rockets fill the skies.

The ultimate challenge is the flying Command Ship with its awesome firepower and protective shields.

Stereo sound adds to the effect and so do changes in the skies to show day and night, dawn and dusk backdrops to the action. I found my initial response to be one of confusion, but Subroc-3D is undoubtedly the shape of games to come.





You've heard of the game of the film — now see the film of the games.

Well, actually it's a video cartridge of a film which seems to have drifted into obscurity after playing second-fiddle to a horror movie while out on general release recently.

Called Arcade Attack it's an interesting semi-documentary concerned with the battle between the merits of pinball and video machines.

There's a lot of classic shots of pinball machines — many loaned by Pinball Owner's Association members — and a fascinating interview with an ace Defender player, who regards the Swarmers, Mutants and other nasties which inhabit this video game as sentient beings.

And finally a charming animated section at the end of the video film which depicts characters from pin table designs fighting it out with video-inspired aliens. £15 for 28 minutes.

DUAL AERIAL DUELS

JOUST

Take to the air on an ostrich, armed with a lance and battle with a band of buzzard-mounted evil-doers.

Joust takes place in a realm of sheer fantasy and its brand of peculiar aerial combat takes place between either one or two players and the machine.

Dual controls for the duellists encourage the two-player version as higher scores are possible when the players take part in tandem against each other and the machine itself.

Mounted on either an ostrich or a stork, each player mans a flap button and a joystick. He flies his bird towards the enemy riders and attempts to unseat them.

A successful Joust scores points and turns the enemy into an egg which must then be picked up before it hatches into an even more deadly opponent.

The Jousts take place between suspended outcrops of rock over which the combatants flap. Other features include a deadly pterodactyl which swoops down to engage the players; fire consumes the rock bridges leaving less space to land; and a lava troll takes shape, reaching up to grab anything which flies over its den.

The second, seventh, 12th — and so on — waves are termed Survival Waves where players are rewarded for not losing riders and every fifth wave is an egg wave with extra points to be won. Weird and wonderful.

ACTION

GAPPING GUIDELINES

OUTLINE TIPS

Outline encourages you to improve rapidly as you learn your way around its mazy courses.

Remember that the sparks travel at the same speed you do and when only one is on your trail there should be no problems if you keep moving. He can't catch you up and you can't get trapped anywhere.

Outline offers a joystick and a "gap" button as the controls. The joystick takes some getting used to because it needs constant pressure to keep moving. While the gap button should not be used for the first few screens as it only complicates matters.

Like all maze-games, once you have got a procedure for beating each screen, you should memorise it and stick with it.

Gapping breaks the line behind you but in corners it can lead to problems as you can gap yourself in behind two barriers. The gap lasts for several seconds before the diagram completes itself again.

It is possible to start at different levels in Outline but score and practice suggest it is best to start from the first level. This presents you with a "+" like shape and a single spark. Memorise the spark's early movements and learn just what to expect.

Flashing bonus scores can tempt you off your chosen path and into trouble but are worth three times the score.

The second screen "T" shape only threatens in the long central leg of the "T" where a careless player can get trapped.

The third diagram is the simplest, an "X" shape consists of five squares connected by one solitary line. The best method is to begin at a corner square and when the spark follows you up, leave with a gap behind you, stranding the spark in the corner.

The fourth diagram resembles a distorted "M" and the problems are increased by a second spark. These have a nasty habit of trying to trap you down one of the two long legs of the "M".

When sparks are after you, they tend to follow the "X" coordinate first, so a staggered pattern will often cause the spark to career along a horizontal line above you rather than following you down or up.

Another way to take advantage of the spark's no "U" turn policy is to follow behind it.

Wall five features a huge grid covering the whole screen with two sparks. The time bonus will often beat you on this wall.

If you do, then it's back to the "X" shape with two sparks and then onto a distorted "M" with two sparks which fire faster-moving missiles at you.

The game progresses through the missile firing screens onto invisible mazes which only show the scores, not the lines. At wall 13 you are introduced to the rocks which can hide you from the sparks and in the final wall, No. 20, a super fast spark adds to the problems.



QUEST FOR THE RED PLANET

GRAVITAR

You plot your own intergalactic course through Gravitar's deepest space in the quest for the Red Planet.

Your mission is to collect fuel from the minor planets in the solar system and then storm the Red Planet with its subterranean passages.

Gravitar is a new concept in lunar landing games as it shows you progressively closer pictures of your approach to the planet.

In deep space your only worries are the Death Star — which will try to pull you into its field of gravity — and two pursuing craft sent after you by the Red Planet.

If one of these ships should come too close, the screen enlarges to allow you both to manoeuvre in a dogfight.

Arriving at a planet, you screen changes to show a close up of your craft descending. Soon the features of the planet are discernible. These include rocky mountainscapes usually studded with red bunkers which protect the blue fuel cells.

Taking care to avoid the bunkers' fire, you must manoeuvre over the fuel cell and switch on your tractor beam to fill up with fuel.

The tractor button doubles as a shield button to help you repel enemy fire but each time you use it or the thrust button, fuel is depleted.

Points are scored for successfully raiding a planet in the given time limit, destroying enemy bunkers, collecting fuel and shooting red ships.

The Red Planet challenges you to guide the ship down into a spiral cavern where a clock ticks down on a reactor. Having survived the tunnel journey you must blast the reactor and escape from the tunnel, all in under 23 seconds. If the mission is successfully completed you are taken through to another universe.

Gravitar resembles Asteroids in design and controls. With single lines representing planet surfaces, ships and planets. The controls are: buttons for left and right rotation, fire and thrust buttons and a dual purpose, shield/tractor beam button.

A CAST OF MINNOWS

ANGLER DANGLER

Angler Dangler gives every fisherman a chance to see the one that got away.

This fishing game sets you down on a bank with rod and line and a rough idea of where that big fish might lie.

The indication is given on a radar screen which runs the length of the lake and the big fish flash up on it as they swim between the banks of reeds.

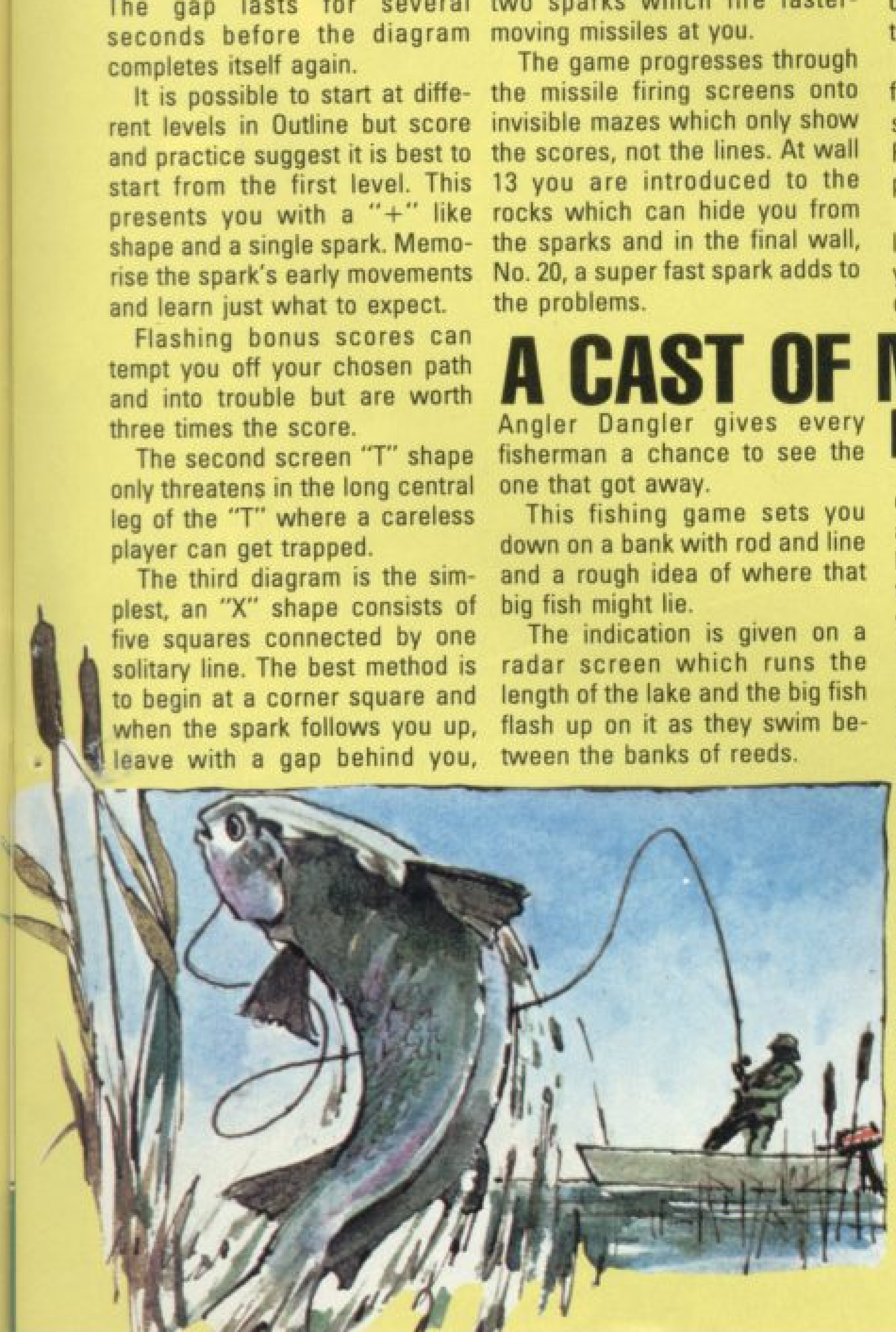
A pointer moves swiftly up and down beside the radar screen and this represents the current length of your cast. By casting as the pointer passes over a fish, you should be able to deliver a hook to the best part of the lake.

The small size tiddlers are fast to react but you can give the larger specimens a better chance of being first onto your hook by pulling it towards him.

With a tiddler on your hook you may decide to cast again by losing the fish in the reeds.

But if you have attracted a real monster then the fight begins, steering him around any obstructions, watch the line tension as he fights and you reel in.

The landing of these large specimens can be quite hard, and you only have so many hooks . . .



Illustrations: Jon Davis

Take-off for far away places with strange sounding names at the controls of a giant Jumbo jet.

Will you be able to pilot the huge jet and land it safely? You'll soon know once you've programmed in this flight simulation which will test your skills to the limit.

By gradually lowering your speed and altitude you have to achieve a safe landing in five sequences. The computer will ask you for the relevant instructions on your run-in to the airstrip. Lowering your airspeed of altitude by too much will cause the jet to stall.

Can you keep the jet and your passengers on the straight and narrow?

There are two skill levels and impressive graphics to enjoy.



Illustration: Jon Davis

AIRLINE PILOT

BY B. SUMMERHAYS

RUNS ON A SHARP MZ80K IN 32K

```
10 REM COPYRIGHT BY B.SUMMERHAYES 1982
11 REM WHITEWAYS MIDDLE SHEFFIELD 4
20 TI$="000000"
25 PRINT"▒"
30 PRINT"▒▒▒▒▒▒▒▒▒▒          AIRLINE PILOT"
40 IF TI$="000004"THEN GOTO 60
50 GOTO25
60 PRINT"▒"
61 PRINT"         AIRLINE PILOT by B.S. "
70 PRINT"                                  "
80 PRINT"You are the pilot of a Jumbo jet."
90 PRINT"▒By gradually lowering speed and"
100 PRINT"▒altitude you must achieve a safe"
110 PRINT"▒landing in 5 sequences.
120 PRINT"▒Wind speed is added onto airspeed "
130 PRINT"in each sequence.A minus windspeed"
140 PRINT"denotes wind against and will slow"
150 PRINT"you down accordingly."
160 PRINT"LOWERING AIRSPEED OR ALTITUDE BY"
170 PRINT"▒TOO MUCH CAUSES A STALL OR A SPIN!"
790 A=INT(RND(10)*1000)+4000
800 PRINT"▒▒PRESS H FOR HARD GAME,N FOR NORMAL"
810 GETZ$
820 IFZ$=""THENGOTO810
830 IFZ$="H"THENA=A+1000
900 TI$="000000"
1000 D=40
1010 W=INT(RND(10)*40)+20
1020 X=INT(RND(10)*6)+1:IFX<3THENW=-W
1030 F=INT(RND(10)*50)+200
1040 S=INT(RND(10)*100)+400
1059 PRINT"▒"
1060 PRINT"         FLIGHT BA 103          "
1070 PRINT"                                "
1080 PRINT"  ^   ~~~   ~~~~ ~~   ~~~       "
1090 PRINT"~/~~~~~~~~~~~~~ ~~~~~~~~~ ~~~   "
1100 PRINT"            /\                  "
1110 PRINT"       ┌┴┐                      "
1120 PRINT"               H                "
1130 PRINT" ~~~~~~~~~~~~~~~~~~~~~~~~~~~~   "
1140 PRINT"  ~   ~   ~~~  ~   ~|\          "
1150 PRINT"____________________▬▬▬_        "
2000 PRINT"DISTANCE";D;"Miles to runway"
2010 PRINT"▒WIND ";W;"knots"
2020 PRINT"▒FUEL LEFT";F;"gallons"
2030 PRINT"▒AIRSPEED";S;"knots"
2040 PRINT"▒ALTITUDE";A;"feet"
2050 S=S+W
2060 PRINT"DECREASE SPEED BY ? KNOTS":INPUTB
2070 S=S-B
2080 F=F-(B/2)
2090 IFB>130THENPRINT"ENGINES STALLED":GOTO7000
2100 FORI=1TO300
2110 PRINT"DECREASE ALTITUDE BY ? FEET":INPUTC
2120 IFC>1500THENPRINT"YOU ARE IN A SPIN"GOTO7500
2130 A=A-C
2140 GOSUB9000
2150 E=INT(RND(10)*10)+1
2160 IFE>6THENA=A+(E*100)
2170 IFE>6THENPRINT"▒SEVERE TURBULENCE YOU MUST
ASCEND ";(E*100);"FEET"
2180 PRINT"┌─────────────────────────────┐"
2190 PRINT"|~~~~~~~~~~~~~~~~/\/\~~~~~ ~~~~~~"
2200 PRINT"               /\               "
2210 PRINT"               /\               "
2220 PRINT"           '  /  \              "
2230 PRINT"       ┌─┴─┐                    "
2240 PRINT"       |   |          | |       "
2250 PRINT"                       ├─┤      "
2260 PRINT"~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~"
2270 PRINT"▒▒DISTANCE 30 miles to runway"
2271 D=30
2280 PRINT"▒WIND SPEED";W;"knots"
2290 PRINT"▒FUEL LEFT ";F;"gallons"
2300 PRINT"▒AIRSPEED";S;"knots"
2310 PRINT"▒ALTITUDE";A;"feet"
2320 PRINT"DECREASE SPEED BY ? KNOTS":INPUTG
2330 S=S-G
2340 IF G>150THENPRINT"ENGINES STALLED"GOTO7000
2350 H=INT(RND(10)*20)+1
2360 W=W+H
2370 S=S+W
2380 PRINT"DECREASE ALTITUDE BY ? FEET":INPUTJ
2385 IFJ>1500THENGOTO7500
2390 A=A-J
2395 GOSUB9000
2400 K=INT(RND(1)*10)+1
2410 IFK<5THENPRINT"YOU HAVE A FUEL LEAK,";
(K*10);"GALLONS LOST"
2420 IFK>5THENPRINT"YOUR HOSTESS HAS
BROUGHT YOUR COFFEE"
2430 IFK<5THENF=F-(K*10)
2440 F=F-(K*8)
2450 IFF<1THENPRINT"NO FUEL LEFT":GOTO8000
2460 PRINT"┌─────────────────────────────┐"
2470 PRINT"                                "
2480 PRINT" ~~~~ ~~~~~~~~~~ v ~~~~~~~~\~ "
2490 PRINT"       ~~~~        ~~~~         "
2500 PRINT"               /\▟              "
2510 PRINT"               /\               "
2520 PRINT"              /  \              "
2630 PRINT"         _|_  /..\              "
2640 PRINT"         |  |  . . .            "
2650 PRINT"└─────────────────────────────┘"
2660 PRINT"▒ DISTANCE 20 miles"
2670 D=20
2680 W=W+K
2690 PRINT"▒WIND SPEED";W;"knots"
```

```
2700 PRINT"▒FUEL LEFT";F;"gallons"
2710 PRINT"▒AIRSPEED";S;"knots"
2720 PRINT"▒ALTITUDE";A;"Feet"
2730 PRINT"▒DECREASE SPEED BY ? KNOTS":INPUTL
2740 S=S-L
2750 IFL>100THENPRINT"ENGINES STALLED"
2760 IFL>100THENGOTO7000
2770 IFS<50THENPRINT"ENGINES STALLED"
2780 IFS<50THENGOTO7000
2790 PRINT"DECREASE ALTITUDE BY ? FEET":INPUTM
2800 A=A-M
2810 IFA<500THEN GOTO 8000
2820 IF M>1200THENPRINT"YOU ARE IN A SPIN"
2830 IFM>1200THENGOTO7500
2840 F=F-(L/4)
2845 GOSUB9000
2850 N=INT(RND(10)*10)+1
2860 W=W+N
2870 O=N*100
2880 IFN>5THEN PRINT"HEAVY CLOUD;AUTO-PILOT LOSES YOU";O;"FEET OF ALTITUDE"
2890 IFN>5THENA=A-O
2900 IFN<3THENPRINT"FIRE IN NO.1 ENGINE,YOU LOSE AIRSPEED":FORY=1TO2000:NEXT
2910 IFN<3THENS=S-67
2920 IFS<60THENGOTO7000
2930 PRINT"PRESS ANY KEY FOR FINAL APPROACH"
2940 GETZ$
2950 IFZ$=""THENGOTO2940
2960 PRINT"▣"
2970 PRINT"┌──────────────────────────────────────┐"
2980 PRINT"│                                      │"
2990 PRINT" ~~~~~~/\~~~~~~/\~~~~~~~^^~^^~~~~^    "
3000 PRINT"               / \                    "
3010 PRINT"               / \                    "
3020 PRINT"              /...\  ▒                "
3030 PRINT"              /...\ ▒▒▒▒              "
3040 PRINT"              .....                   "
3050 PRINT"└──────────────────────────────────────┘"
3060 PRINT"▒DISTANCE,10 miles to touchdown "
3070 D=10
3080 W=W-14
3090 PRINT"WIND SPEED";W;"knots"
3100 S=S-W
3110 PRINT"▒FUEL LEFT";F;"gallons"
3120 PRINT"▒AIRSPEED";S;"knots"
3130 PRINT"▒ALTITUDE";A;"Feet"
3140 PRINT"▒DECREASE SPEED BY ? KNOTS":INPUTP
3150 IFP>120THENGOTO7000
3160 S=S-P
3270 IFS<50THENGOTO7000
3280 PRINT"DECREASE ALTITUDE BY ? FEET":INPUTQ
3290 IFQ>1500 THENGOTO7500
3300 A=A-Q
3310 IFA<200THENGOTO7500
3320 F=F-(S/4)
3330 IFF<1THEN PRINT"NO FUEL LEFT"
3340 IFF<1THENGOTO7900
3345 GOSUB9000
3350 E=INT(RND(10)*10)+1
3360 W=W-E
3370 IFE<4THENPRINT"ELECTRIC STORM DETOUR COSTS 54 GALLONS OF FUEL"
3380 IFE<4THENF=F-54
3390 IFE>6THENA=A+500
3400 IFE=5THENPRINT"A HIJACKER HAS BLOWN A HOLE IN THE FUSELAGE"
3410 IFE=5THENFORY=1TO2000:NEXT
3411 IFE=5THENGOTO7500
3420 PRINT"PREPARE TO LAND,PRESS ANY KEY"
3430 GETZ$
3440 IFZ$=""THENGOTO3430
3450 PRINT"▣"
3460 D=0
3470 PRINT"┌──────────────────────────────────────┐"
3480 PRINT"│                                      │"
3490 PRINT"│                                      │"
3510 PRINT"                               ▒▒      "
3520 PRINT"          /   \               ▒▒▒▒▒▒▒ "
3530 PRINT"         ▌▐▐▐▐▌                ▒▒▒▒▒▒▒ "
3540 PRINT"        /       \              ▒ ▒▒ ▒  "
3550 PRINT"        /........\                    "
3560 PRINT"└       /........\  ┌┐                "
3565 R=E*10
3570 PRINT"RUNWAY BELOW ,▒LANDING SPEED SHOULD BE   ";R;"knots"
3580 PRINT"ACTUAL SPEED IS";S;"knots "
3590 PRINT"▒ALTITUDE SHOULD BE 0 FEET"
3595 D=0
3600 PRINT"▒ACTUAL ALTITUDE IS";A;"Feet"
3600 PRINT"▒ACTUAL ALTITUDE IS";A;"Feet"
3610 F=F-39
3620 PRINT"▒FUEL LEFT ";F;"gallons"
3630 IFF<1THENGOTO7900
3640 PRINT"DECREASE SPEED BY ? knots":INPUTT
3650 IFT>80THEN GOTO7000
```



Illustration: Jon Davis

```
3660 S=S-T
3670 IFS<>RTHENGOTO8000
3680 PRINT"DECREASE ALTITUDE BY ? FEET":INPUTU
3690 IFU>1000THENGOTO7500
3700 A=A-U
3800 IFA<>0THENGOTO8000
3850 GOSUB9000
3900 GOTO5000
5000 PRINT"▒"
5010 PRINT""
5020 PRINT""
5030 PRINT""
5040 PRINT"          WELL DONE!!!!            "
5050 PRINT"▒▒▒A  SAFE LANDING                 "
5060 PRINT"▒────────────────────────────────┐"
5070 PRINT" |                               |"
5080 PRINT" |          O                    |"
5090 PRINT"            |●                    "
5100 PRINT"             ▒─O                  "
5110 PRINT"            | |                   "
5120 PRINT"──────────────────────────────────"
```

```
5140 PRINT"YOUR PILOT RATING IS ";TI$;"
     FAULTS,(000000 IS PERFECT)"
5150 PRINT"▒LESS THAN 000120 IS VERY GOOD"
5160 PRINT"▒ABOVE 000500 IS POOR"
5170 PRINT"ANOTHER FLIGHT?"
5180 GETZ$:IFZ$=""THEN GOTO5180
5190 IFZ$="Y"THENGOTO60
5200 IFZ$="N"THENGOTO10000
5230 GOTO10000
7000 PRINT"▒"
7010 PRINT"▒▒▒▒▒EMERGENCY!!!!"
7020 X=53248
7030 POKEX+410,05
7040 POKEX+411,14
7050 POKEX+412,07
7060 POKEX+413,09
7070 POKEX+414,14
7080 POKEX+415,05
7090 POKEX+416,19
```

```
7100 POKEX+417,64
7120 POKEX+418,19
7130 POKEX+419,20
7140 POKEX+420,01
7150 POKEX+421,12
7160 POKEX+422,12
7170 POKEX+423,05
7180 POKEX+424,04
7190 FORW=1TO3000:NEXT
7200 GOTO7800
7490 PRINT"■"
7500 PRINT"■"
7501 PRINT"■■■EMERGENCY!!!!"
7510 PRINTTAB(10);"■■RATE OF DESCENT TOO GREAT"
7520 PRINTTAB(15);"■■YOU ARE IN A SPIN "
7522 TEMPO7
7523 MUSIC"¯B¯A¯G¯F¯E¯D¯CBAGFEDC_B_A_G_F_E_D_C"
7530 FORW=1TO3000:NEXT
7800 PRINT"■"
7810 E=INT(RND(10)*8)+1
7811 PRINT"■■■        DONT PANIC!!!"
7815 PRINT"■■■PANIC BUTTON"
7816 PRINT"    ____________________"
7817 PRINT"■ONE AND ONLY ONE OF THE NUMBER"
7818 PRINT"■BUTTONS WILL SAVE YOU"
7819 PRINT"■PRESS ONE NOW (1TO 9)":INPUTZ
7830 PRINTZ
7840 IFZ=ETHENPRINT"YOU ARE BACK ON COURSE"
7845 IFZ=ETHENFORY=1TO3000:NEXT
7850 IFZ=ETHEN A=4000
7855 IFZ=ETHENGOTO900
7860 IFZ<>ETHENPRINT"HARD LINES,IT WAS";E;"THIS TIME!"
7865 FORW=1TO2000:NEXT
7870 GOTO8000
7900 PRINT"■"
7905 PRINT"■■■■■■         NO FUEL LEFT"
7910 PRINT"              ____________"
7915 PRINT"DONT START READING ANY LONG BOOKS"
7916 PRINT"■■ALL POWER LOST,ALL ENGINES DEAD"
7920 FORW=1TO3800:NEXT
8000 PRINT"■"
8010 Y=INT(RND(10)*4)+1
8020 IFY=1THENY$="INTO THE SEA"
8030 IFY=2THENY$="INTO A MOUNTAIN"
8040 IFY=3THENY$="INTO A SEWAGE WORKS"
8050 IFY=4THENY$="INTO A CONCRETE FACTORY"
8060 IFY=5THENY$="INTO A CUSTARD FACTORY"
8070 PRINT"■■■■■         DISASTER!!!!"
8080 PRINT"        _______________"
8090 PRINT"■■■■■YOU HAVE CRASHED ";Y$;" AND ITS A MESS."
8091 PRINT"■■To say the least!"
8092 TEMPO6
8093 MUSIC"C6R2C4R1C4R1C6R1#D4R1D4R1D4R1C4R1C4_B4R1C6"
8100 PRINT"■■■TRY AGAIN?"
8200 GETZ$:IFZ$=""THENGOTO8200
8300 IFZ$="Y"THEN GOTO 60
8350 GOTO10000
8375 PRINT"■"
9000 PRINT"■"
9010 PRINT"   VIDEO SIMULATION-SIDE VIEW "
9020 PRINT"______________________________"
9030 PRINT""
9031 PRINT""
9032 PRINT""
9033 PRINT""
9034 PRINT""
9035 PRINT""
9036 PRINT""
9037 PRINT""
9038 PRINT"~~^~^~
9039 PRINT"        \________ n_._H~~~~~~~~~"
9050 PRINT"   MTS                                "
9060 PRINT"            RUNWAY          SEA     "
9070 E=53248
9075 USR(62)
9080 IFD<41THENPOKEE+315,196
9081 USR(62)
9090 IFD<31THENPOKEE+345,196
9091 USR(62)
9100 IFD<21THENPOKEE+380,196
9101 USR(62)
9200 IFD<11THENPOKEE+418,196
9201 USR(62)
9300 IFD<1THENPOKEE+495,196
9301 USR(62)
9350 FORN=1TO4000:NEXT
9375 PRINT"■"
9400 RETURN
10000 PRINT"■■■■■■■■■■■THANK YOU FOR FLYING WITH US,GOODBYE."
10010 PRINT"■"
10020 GOTO10000
10040 END
```

BY R. M. STEVENSON

Golf

RUNS ON A BBC MODEL B IN 32K

"Fore! Ah, hello old chap. Out for a spot of golf then eh? Wonderful sport, what! Lots of fresh air and exercise. But sometimes you will find yourself stuck in the office for an afternoon. Or the weather will be so absolutely foul you won't be able to even lift a club for days!

That's where these computer chappies come in useful. They've got golf off to a tee on the old micro. Jolly good when you can't get down to the links . . . oh, excuse me, jolly old ball seems to have got lodged in the branches of that pine tree. Bye for now!"

This program includes all the elements of the real game. Bunkers, greens, and even the dreaded "rough". You can tell the computer how many holes you wish to play and it sets up the course for you.

It will ask you which direction you wish to make your shot to the green, and how hard you wish to hit the ball. The direction is calculated from 0 to 12 as in the hands of a clock, and strength by inputting a value from 0-100 which will represent the distance the ball travels in yards.

If you get into the trees you incur a penalty shot. If you get stuck in the rough you will have to hit your ball four times as hard as normal. If you land in a bunker you'll need to adjust your hitting power up to five times more than normal.

Good luck, good hitting, and we'll see you back at the clubhouse!

The following alterations are required to run the program on a model A machine.

Change line 10 and 110 to read MODE 4. Change line 115 to read COLOUR 1. In lines 120, 121 and 123 remove all the COLOUR statements and the colons immediately following them. Change line 270 to read COLOUR 1.

In line 1020 remove the COLOUR 0 statement and the colon immediately following it. Change the MODE 1 and COLOUR 2 statements in line 1340 to read MODE 4 and COLOUR 1 respectively.

```
10MODE1
20VDU23,255,24,60,126,60,24,24,24,24
30VDU23,254,153,219,90,60,60,24,24,24
40VDU23,253,90,255,126,124,62,126,255,102
50VDU23,252,28,60,124,12,12,12,12,12
60VDU23,250,126,129,189,161,161,189,129,126
70VDU23,251,0,0,0,0,24,60,60,24
80PRINTTAB(18)"GOLF"'TAB(18)"____":PRINT:PRINTTAB(5)CHR$(250)" R.M.STEPHENSON
(1982)"
90PRINTTAB(5,5)"Do you want instructions(Y/N)?";:A$=GET$:IFLEFT$(A$,1)<>"Y"TH
EN130
100GOSUB 1360
110MODE1
115COLOUR2
120PRINT:PRINT:PRINTTAB(5);:COLOUR3:PRINT"'|' ";:COLOUR2:PRINT"represents the
hole"''TAB(5);:COLOUR3:PRINT"'";:COLOUR1:PRINT">";:COLOUR3:PRINT"' ";:COLOUR2:PR
INT"represents a bunker"''TAB(5);:COLOUR3:PRINT"'^' ";:COLOUR2:PRINT"represents
the rough"'
121PRINTTAB(5);
123COLOUR3:PRINT"'";:COLOUR131:COLOUR0:PRINT"";:COLOUR3:COLOUR128:PRINT"'";:CO
LOUR2
125COLOUR128:PRINT" represents a tree"'TAB(5);:COLOUR3:PRINT"'C' ";:COLOUR2:P
RINT"represents your ball"
130RUF=0:BUNKER=0
150SH=0:COURSE=0
160SP$="                                        "
180PRINT:PRINT:PRINTTAB(12):INPUT"HOW MANY HOLES DO YOU WISH TO PLAY ?"H
190FORCOE=1TOH
200VDU19,2,2,0,0,0
210COLOUR 130
220CLS
230PAR=RND(3)+2
240YARDS=RND(100)+PAR*50
250X=2:Y=5
260FORTREES=1TO7
270      COLOUR0
280A=RND(27)+5:B=RND(23)
290FORLM=0TORND(4):PRINTTAB(A+LM,B)"":IFRND(2)=1THENNEXTLM ELSE PRINTTAB(A+LM+
1,B+1)" ":NEXTLM
300FORLM=0TORND(6):PRINTTAB(A+LM,B+1)"";:IFRND(2)=1THENNEXTLM ELSE PRINTTAB(A+
LM+1,B+1)" ":NEXTLM
310FORLM=0TORND(3):PRINTTAB(A+LM,B+2)"":IFRND(2)=1THENNEXTLM ELSE PRINTTAB(A+L
M+1,B+2)" ":NEXTLM
320NEXTTREES
330GOTO430
340COLOUR1
350FORBUNKER=1TO2
360V=RND(2):IFV=1THENV=GRY-RND(3)
370IFV=2THENV=GRY+RND(3)
380N=RND(2):IFN=1THENN=GRX-RND(3)
390IFN=2THENN=GRX+RND(2)
400PRINTTAB(N,V)">>"
410NEXTBUNKER
420GOTO480
430STRFACT=YARDS/40
440GRY=7:GRX=YARDS/STRFACT-5:GRY=GRY+RND(8)
450COLOUR1
460COLOUR3:PRINTTAB(GRX,GRY)"|"
470GOTO340
480COLOUR3
490GRA=GRX-3:GRB=GRY-2
500COLOUR3:PRINTTAB(GRX,GRY)"|"
510FORROUGH=1TO4
520COLOUR7
530W=RND(30):Q=RND(23)
540PRINTTAB(W,Q)"^^^^"
550PRINTTAB(W,Q+2)"^ ^^^"
560NEXTROUGH
570COLOUR3
580 COLOUR3:PRINTTAB(GRX,GRY)"|"
590MK=3:FORLS=5TOGRY
600PRINTTAB(MK,LS)" "TAB(MK,LS-1)" "TAB(MK,LS-2)" "TAB(MK,LS+1)" "TAB(MK,LS+2)
" "
610MK=MK+1:NEXTLS
620FORKH=GRX-MK-1 TO GRX-7
630PRINTTAB(KH,GRY)" "TAB(KH,GRY-1)" "TAB(KH,GRY+1)" "
640NEXTKH
650REM****COURSE SET UP,NOW PRINT      DETAILS AND INPUT MOVE
660COLOUR3
670PRINTTAB(X,Y)"C"
680COLOUR1
690IF COURSE=0 THEN A$="EVENS":GOTO720
700IF ABS(COURSE)<>COURSE THEN A$=STR$(ABS(COURSE))+" UNDER"
710IF ABS(COURSE)=COURSE THEN A$=STR$(ABS(COURSE))+" OVER"
720 COLOUR3:PRINTTAB(0,1)"PAR ";PAR;"    ";YARDS;" YARDS";"    COURSE PAR :";A$;
TAB(2,27)"SHOTS : ";SH'TAB(2)"HOLE : ";COE'TAB(2)"COURSE LENGTH ";H;" HOLES"
730PRINTTAB(2,30)"DIRECTION (0 TO 12)";:INPUTANG
740IFANG>12 OR ANG<0.1 THENPRINTTAB(2,30)SP$:GOTO730
750PRINTTAB(2,30)SP$;TAB(2,30)"STRENGTH(0 TO 100)";:INPUTS
760IF RUF=1 THEN RUF=0:S=S/4
770IF BUNKER=1 THEN BUNKER=0:S=S/5
```

Illustration: Dorian Cross

```
780PRINTTAB(2,30)SP$
790IFS>100THENS=100
800S1=40/YARDS
810S=S*S1
820PRINTTAB(X,Y)" "
830ANG=ANG*(PI/6)
840X=X+S*SIN(ANG)
850Y=Y-S*COS(ANG)
860SH=SH+1
870IFX>39THENX=39
880IFX<0THENX=0
```

```
890IFY<0THENY=0
900IFY>25THENY=25
910A$=FNREADCH(X,Y)
920IF A$="|"THENGOTO970
930IF A$=""THENGOTO1090
940IF A$="^"THENGOTO1150
950IF A$="}"THENGOTO1210
960GOTO670
970TOT=PAR-SH
980COURSE=COURSE-TOT
```

```
990IFABS(COURSE)=COURSE THENA$=STR$(COURSE)+" OVER"
1000IF COURSE=0 THENA$="EVENS"
1010IFABS(COURSE)<>COURSE THENA$=STR$(ABS(COURSE))+" UNDER"
1020COLOUR0:PRINTTAB(5,15);"CONGRATULATIONS!YOU HOLED IT IN ";SH'"                    THAT TAK
ES YOU TO ";A$
1030FORA=1TO8000:NEXT
1040SH=0
1050IF H=1 OR H=0 THEN1270
1060CLS
1070PRINTTAB(0,30)SP$;TAB(0,31)SP$
1080IFCOE=H THEN1270 ELSE NEXT COE
1090PRINTTAB(0,30)"IN THE TREES - PENALTY SHOT"
1100SH=SH+1
1110PRINTTAB(X,Y)"{"
1120FORA=1TO8000:NEXTA
1130PRINTTAB(0,30)SP$
1140GOTO960
1150PRINTTAB(0,30)"IN THE ROUGH"
1160PRINTTAB(X,Y)"{"
1170FORA=1TO8000:NEXTA
1180PRINTTAB(0,30)SP$
1190RUF=1
1200GOTO960
1210PRINTTAB(0,30)"BUNKERED - A CHIP SHOT IS NEEDED"
1220PRINTTAB(X,Y)"{"
1230FORA=1TO10000:NEXTA
1240PRINTTAB(0,30)SP$
1250BUNKER=1
1260GOTO960
1270CLS
1280IFABS(COURSE)=COURSE THEN A$=STR$(COURSE)+" OVER FOR THE COURSE"
1290IFCOURSE=0THENA$="EVEN PAR FOR THE COURSE"
1300IF ABS(COURSE)<>COURSE  THEN A$=STR$(ABS(COURSE))+" UNDER FOR THE COURSE"
1310MODE7:PRINT:PRINTTAB(14);CHR$(129);CHR$(141);"GOLF"'TAB(14);CHR$(129);CHR$(
141);"GOLF"
1320PRINTTAB(15);CHR$(129);"----"
1330PRINT:PRINT:PRINTCHR$(130);CHR$(141);"YOU ENDED UP ";A$';CHR$(130);CHR$(141
);"YOU ENDED UP ";A$
1340PRINT:PRINT:PRINT:PRINTTAB(5)"ANOTHER GAME (Y/N)?";:A$=GET$:IFLEFT$(A$,1)="
N"THEN END ELSEPRINT:PRINTTAB(5)"DO YOU WANT INSTRUCTIONS(Y/N)?";:A$=GET$:IF A$=
"Y" THEN GOTO100 ELSE MODE1:COLOUR2:GOTO130
1350END
1360MODE7:PRINT:PRINTTAB(14);CHR$(129);CHR$(141);"GOLF"'TAB(14);CHR$(129);CHR$(
141);"GOLF"
1370PRINTTAB(15);CHR$(129);"----"
1380IS$="When the computer asks you for your      'DIRECTION',you must type in a
number    between 0 and 12(as in hands of a clock)(decimals are allowed).
   "
1390I2$="When it asks for strength,your input      (0 to 100),represents how far
the ball  will travel in yards,(but remember that the actual distance it travels
 on the    screen will be proportionate to the      length of the hole)."
1400I3$="You must avoid the trees,because when    they are hit,they cause you to
incur a  penalty shot.Also to be avoided is the  rough,as your hitting power is
severely reduced (you will need about four times normal hitting power)."
1410I4$="When in a bunker,you will need to hit    the ball five times as hard as
usual."
1420FOR SY=1TO LEN(IS$):PRINT MID$(IS$,SY,1);:SOUND0,-10,1,1:FORA=1TO150:NEXTA:
NEXTSY:FORGR=1 TO LEN(I2$):PRINTMID$(I2$,GR,1);:SOUND0,-10,1,1:FORA=1TO150:NEXTA
:NEXTGR
1430 PRINT':FORNS=1 TO LEN(I3$):PRINT MID$(I3$,NS,1);:SOUND0,-10,1,1:FORA=1TO15
0:NEXTA:NEXTNS:PRINT':FORNS=1 TO LEN(I4$):PRINT MID$(I4$,NS,1);:SOUND0,-10,1,1:F
ORA=1TO150:NEXTA:NEXTNS
```

```
1440FORLX=1TO5000:NEXT:RETURN
1450END
1460DEF FNREADCH(X,Y)
1470X=INT(X):Y=INT(Y)
1480LOCAL A%,LASTX,LASTY,C
1490LASTX=POS
1500LASTY=VPOS
1510VDU31,X,Y
1520A%=135
1530C=USR(&FFF4)
1540C=C AND &FFFF
1550C=C DIV &100
1560VDU31,LASTX,LASTY
1570= CHR$(C)
>
```

BY STEPHEN SHAW

POMPEII

RUNS ON A T.I. 99/4 OR 99/4A IN 16K IN EXTENDED BASIC

In the ashes of Pompeii, the ancient Roman city devastated by a volcano, some gaming counters, in the shape of trussed up chickens, were found.
There appear to have been 15 counters in a set with Roman numerals I to XV on one side and the other blank. Historians think that they may have been used with a box with 12 compartments.
Stephen Shaw has delved back into history for this latest brain-teasing program — based on an adaptation of the ancient Roman game produced by Whittlecraft of Worcester.
Rules of the game are included as DATA statements in the program and, says Stephen, should be sufficient for play.

Program notes:

120: Reruns program in case of serious errors-eg, syntax errors. You are advised to insert this line ONLY when the program has proved to be running OK. Otherwise you miss the error messages!-

140: Warning messages are not displayed — the program will continue. BREAK is not totally disabled but can only be used when the machine is waiting for an input.

180: Defines characters 100-102 as the horizontal and vertical lines of the grid and the connecting points (102).

210: VALIDATE will only permit you to enter a Y or N. If you just press ENTER an N is assumed in this prog.

240: Draw 4 horizontal lines

250: Draw 5 vertical lines

270: Put a + in where they join.

280-300: Put the numbers 1-12 in the boxes

320: Display the counter numbers on the left hand side of screen

330-340: General screen information

350: CT (x,1)= numbered side of counter
CT (x,2)= blank side of counter
CTR (x,1)= result of throw
CTR(x,2)= has counter been thrown this round?
Both ctr(x,1) and ctr(x,2) are here set to record the result of the throw, which is then displayed.
(For other computers use CTR(X,1) =CT(etc) ::
CTR(X,2)=CTR(X,1) if you dont have multiple assignments)

360: Tells comp all compartments are free for use.

380: When necessary changes the player (P).

430: Checks to see if counter can be used

490: If only one counter is to be used checks to see if compartment can be used.

500: Tells computer the compartment has been used and deletes the compartment number from the screen. Arrays RR(n) and cc(n) contain the screen locations of the compartment number n.

620-630: Reset counters ONE & TWO as appropriate if they cannot be used.

660: Have all faceup counters been used (if so TOT=0).

680: Rethrow any counters which have not yet landed number up in this round.

700-720: Have NO counters landed face up this time? Then score . . Scoring routine- total value of unused faceup counters goes to TOT while total value of unused compartments goes to TBX

790-800: If one score exceeds 100 *and* player 2 has just completed a round ((ensures no disadvantage to player 1)) then evaluate the scores.

820-870: Final scoring & evaluation

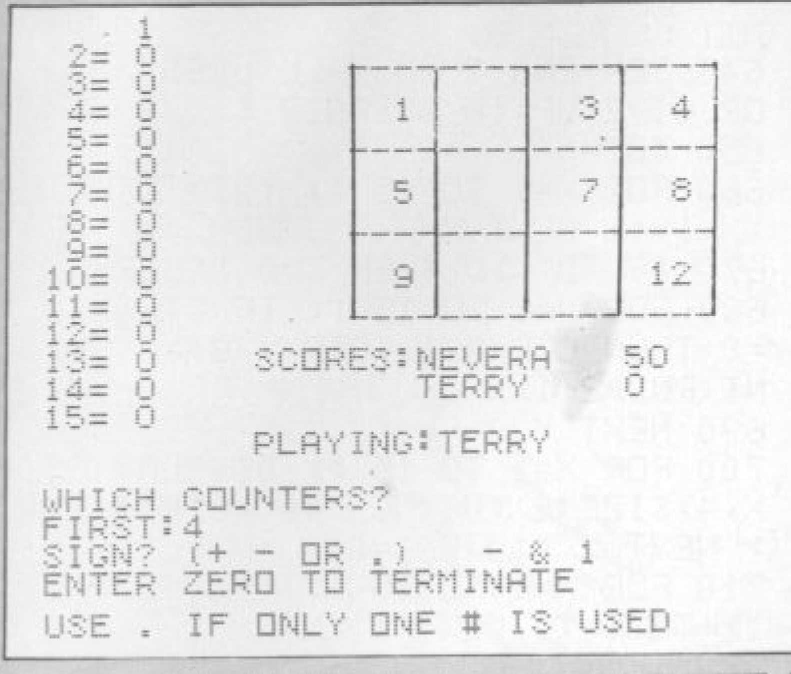
880: Run again — if you do not have RUN as a command then reset scores as shown and use GOTO 1080.

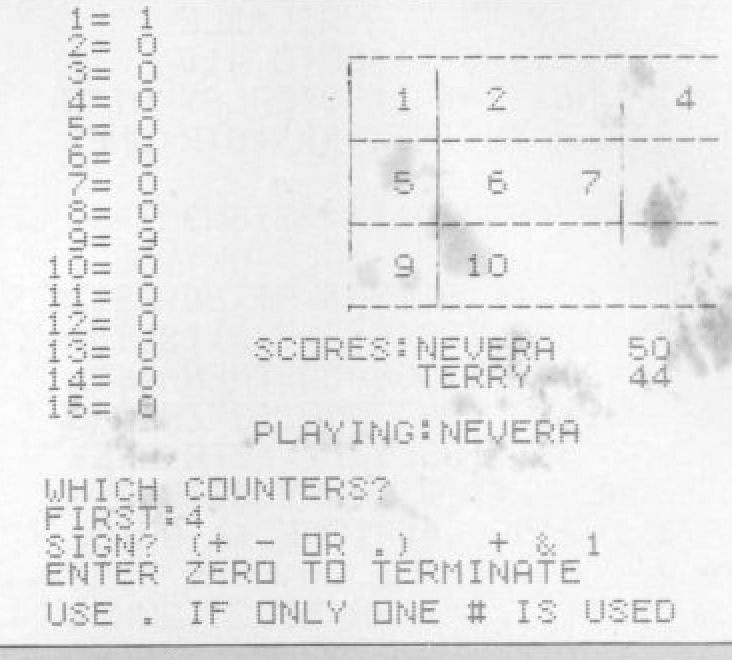
970: If thermal printer has been selected but is not connected or switched on, this line will send you to 1030 for a message and then you will go back to the initial selection of line 920. Otherwise life would be difficult! The error line is amended then in line 940.

1050: Ensures you do not have continuous scrolling-just one screen at a time.



Illustration: Dorian Cross






```
100 REM
110 REM POMPEII - FOR 99/4
IN EXTENDED BASIC          BY S
TEPHEN SHAW © 1982
120 ON ERROR 130
130 CALL CHAR(104,"FF80BE8888B88
0FF017D417D057D01FF")!SJS LOGO
140 ON WARNING NEXT :: ON BREAK
NEXT
150 CALL CLEAR :: RANDOMIZE :: D
IM CT(15,2),CTR(15,2),BX(12),RR(
12),CC(12)
160 DISPLAY AT(2,10):"POMPEII" :
: P=1
170 DISPLAY AT(4,1):"FOR 99/4 BY
 STEPHEN SHAW"
180 CALL CHAR(100,RPT$("0",14)&"
FF"&RPT$("01",8)&RPT$("01",7)&"F
F")
190 CALL HCHAR(6,15,104):: CALL
HCHAR(7,15,105)
200 DISPLAY AT(18,1):"WOULD YOU
LIKE INSTRUCTIONS?" :: DISPLAY A
T(19,10):"Y/N"
210 ACCEPT AT(19,15)BEEP SIZE(1)
VALIDATE("YN"):A$
220 IF A$="Y" THEN 900 ELSE 1080
230 REM SET UP / PLAY FM 240
CONT FROM 340
240 CALL CLEAR :: FOR R=2 TO 11
STEP 3 :: CALL HCHAR(R,16,100,16
):: NEXT R
250 FOR V=15 TO 31 STEP 4 :: CAL
L VCHAR(3,V,101,9):: NEXT V
260 CALL HCHAR(1,12,104):: CALL
HCHAR(2,12,105)! LOGO
270 FOR R=5 TO 11 STEP 3 :: FOR
V=19 TO 31 STEP 4 :: CALL HCHAR(
R,V,102):: NEXT V :: NEXT R
280 FOR R=1 TO 4 :: CC(R)=13+4*R
 :: RR(R)=4 :: CALL HCHAR(4,CC(R
)+1,R+48)
290 CC(R+4)=13+4*R :: RR(R+4)=7
:: CALL HCHAR(7,CC(R+4)+1,R+52)
300 CC(R+8)=13+4*R :: RR(R+8)=10
 :: NEXT R :: CALL HCHAR(10,18,5
7):: CALL HCHAR(10,21,49):: CALL
 HCHAR(10,22,48)
310 DISPLAY AT(10,23)SIZE(2):"11
" :: DISPLAY AT(10,27)SIZE(2):"1
2" ! BOARD DRAWN & NUMBERED
320 FOR X=1 TO 15 :: DISPLAY AT(
X,1)SIZE(3):USING "##=":X :: NEX
T X
330 DISPLAY AT(13,10):"SCORES:"&
P$(1):: DISPLAY AT(14,17):P$(2):
: DISPLAY AT(13,26):STR$(SCORE(1
)):: DISPLAY AT(14,26):STR$(SCOR
E(2))
340 DISPLAY AT(16,10):"PLAYING:"
350 FOR X=1 TO 15 :: CT(X,1)=X :
: CT(X,2)=0 :: CTR(X,1),CTR(X,2)
=CT(X,INT(RND*2+1)):: DISPLAY AT
(X,4)SIZE(2):USING "##":CTR(X,1)
:: NEXT X
360 FOR X=1 TO 12 :: BX(X)=X ::
NEXT X
370 DISPLAY AT(21,1):"ENTER ZERO
 TO TERMINATE"
380 IF TOT=0 THEN 390 :: CALL SO
UND(660,660,0):: P=P+1 :: IF P=3
 THEN P=1 ! CONTINUE PLAY FROM H
ERE
390 DISPLAY AT(16,18)SIZE(10):P$
(P)
400 DISPLAY AT(24,1):"USE . IF O
NLY ONE # IS USED"
410 DISPLAY AT(18,1):"WHICH COUN
TERS? " :: DISPLAY AT(19,1)SIZE
(32):"FIRST:"
420 ACCEPT AT(19,7)BEEP VALIDATE
(DIGIT)SIZE(2):ONE :: IF ONE=0 T
HEN 640
425 IF ONE>15 THEN GOSUB 1130 ::
 GOTO 410
430 IF CTR(ONE,1)<>ONE THEN DISP
```

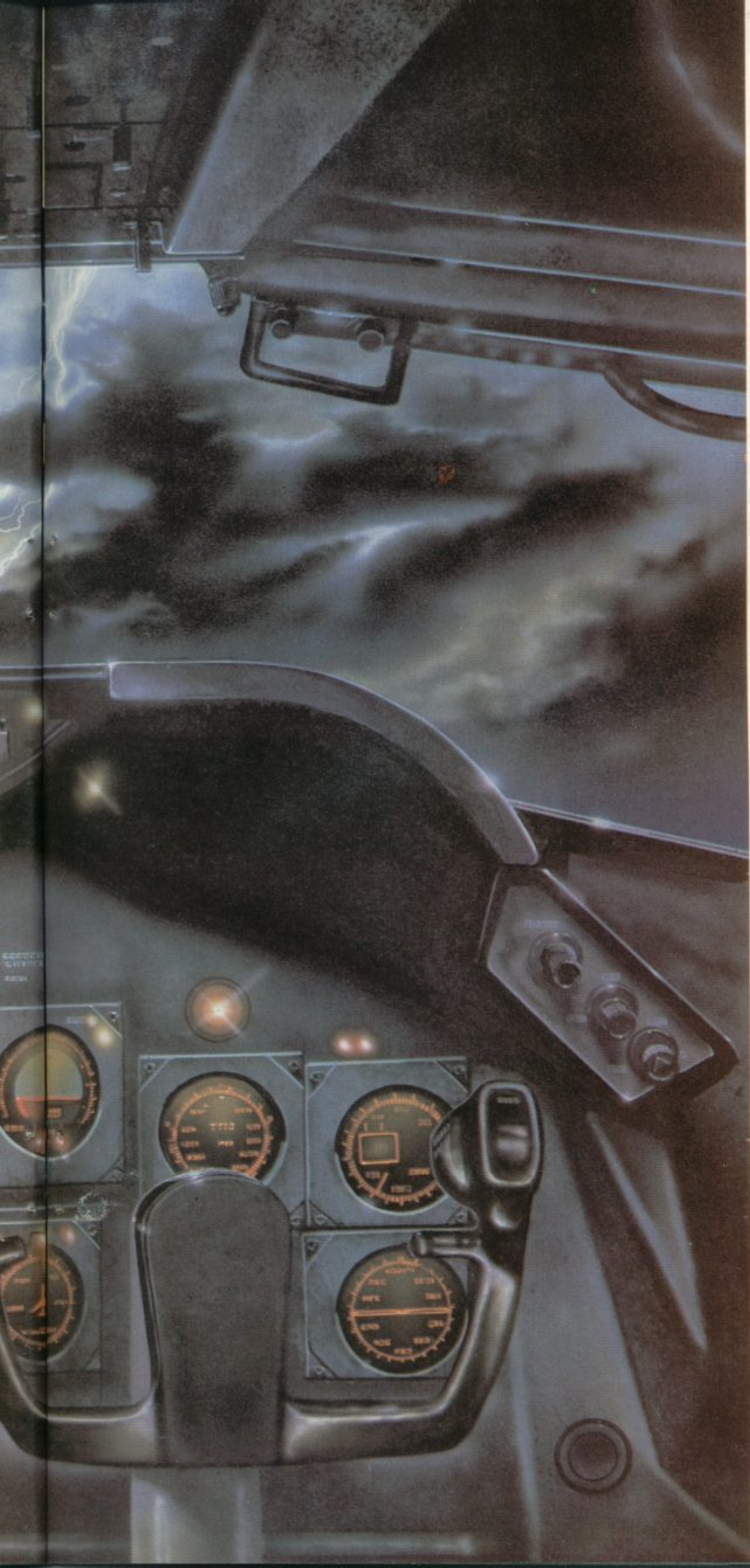
```
LAY AT(19,1):"NOT AVAILABLE
" :: GOSUB 1130 :: GOTO 410
440 CTR(ONE,1)=0 :: DISPLAY AT(O
NE,4)SIZE(2):USING "##":CTR(ONE,
1)
450 DISPLAY AT(20,1):"SIGN? (+ -
 OR .)"
460 SG$="!" :: ACCEPT AT(20,20)B
EEP SIZE(1)VALIDATE("+-."):SG$ :
: IF SG$=" " OR SG$="" THEN 460
470 IF SG$="." AND ONE>12 THEN C
ALL HCHAR(20,1,32,32):: CTR(ONE,
1)=CTR(ONE,2):: DISPLAY AT(ONE,4
)SIZE(2):USING "##":ONE :: GOTO
410
480 IF SG$<>"." THEN 510
490 IF SG$="." AND BX(ONE)<>ONE
THEN DISPLAY AT(19,1):"NOT AVAIL
ABLE   " :: GOSUB 620 :: GOSUB 1
130 :: CALL HCHAR(20,1,32,32)::
GOTO 410
500 IF SG$="." AND BX(ONE)=ONE T
HEN BX(ONE)=0 :: CALL HCHAR(RR(O
NE),CC(ONE),32,2):: CALL HCHAR(2
0,1,32,32):: GOTO 410
510 IF SG$<>"+" AND SG$<>"-" THE
N 410 ! SG$ NOW= + OR -
520 DISPLAY AT(20,22):"&" :: ACC
EPT AT(20,24)SIZE(2)BEEP VALIDAT
E(DIGIT):TWO
530 IF TWO>15 OR CTR(TWO,1)<>TWO
 THEN DISPLAY AT(20,1):"NOT AVAI
LABLE  " :: GOSUB 1130 :: CALL H
CHAR(20,20,32,12):: GOTO 520
540 IF TWO=0 THEN CALL HCHAR(20,
1,32,32):: GOSUB 620 :: GOTO 410
550 CTR(TWO,1)=0 :: DISPLAY AT(T
WO,4)SIZE(2):USING "##":CTR(TWO,
1)
560 IF SG$="+" THEN X=ONE+TWO ::
 IF X>12 THEN DISPLAY AT(20,1):".
ONLY 12 BOXES!" :: GOSUB 620 ::
GOSUB 630 :: GOTO 410
570 IF SG$="-" THEN X=ABS(ONE-TW
O):: IF X>12 THEN GOSUB 620 :: G
OSUB 630 :: GOTO 410
580 IF BX(X)<>X THEN GOSUB 630 :
: GOSUB 620 :: DISPLAY AT(20,1):
"NOT POSSIBLE    " :: CALL HCHAR(
20,1,32,32):: GOTO 410
590 BX(X)=0 :: CALL HCHAR(RR(X),
CC(X),32,2):: CALL HCHAR(19,1,32
,64)
600 GOTO 410
610 STOP
620 CTR(ONE,1)=CTR(ONE,2):: DISP
LAY AT(ONE,4)SIZE(2):USING "##":
ONE :: RETURN
630 CTR(TWO,1)=CTR(TWO,2):: DISP
LAY AT(TWO,4)SIZE(2):USING "##":
TWO :: RETURN
640 REM END TURN (ALL USED
OR GIVE UP IN DESPAIR !
650 TOT=0
660 FOR X=1 TO 15 :: TOT=TOT+CTR
(X,1):: NEXT X
670 IF TOT<>0 THEN 750 !SCORE
680 FOR X=1 TO 15 :: IF CTR(X,2)
=0 THEN CTR(X,1),CTR(X,2)=CT(X,I
NT(RND*2+1))
690 NEXT X
700 FOR X=1 TO 15 :: DISPLAY AT(
X,4)SIZE(2):USING "##":CTR(X,1):
: NEXT X :: TEST=0
710 FOR X=1 TO 15 :: TEST=CTR(X,
1)+TEST :: NEXT X
720 IF TEST=0 THEN 750 ! PERFECT
 SCORE
730 GOTO 380 !CONTINUE SAME PLAY
ER
740 STOP
750 TBX=0 ! SCORE SECTION
760 FOR X=1 TO 12 :: TBX=TBX+BX(
X):: NEXT X
770 SCORE(P)=SCORE(P)+TOT+TBX
780 DISPLAY AT(12+P,26):USING "#
##":STR$(TOT+TBX):: TOT=-1
790 IF SCORE(1)>100 OR SCORE(2)>
100 THEN 800 ELSE 280
800 IF P=2 THEN 820 ELSE 280
810 STOP !****
820 CALL CLEAR :: IF SCORE(1)>SC
ORE(2)THEN P=1 ELSE P=2
830 PRINT
840 PRINT P$(P)&" SCORE "&STR$(S
CORE(P))&" LOSES": :
850 P=P+1 :: IF P=3 THEN P=1
855 PRINT P$(P)&" SCORE "&STR$(S
CORE(P))&" WINS": : : :
860 PRINT "ANOTHER GAME? Y OR N"
;:: INPUT A$ :: IF A$="Y" THEN 8
80 ELSE IF A$<>"N" THEN 860
870 STOP
880 SCORE(1),SCORE(2)=0 :: RUN 1
080
890 STOP
900 REM INSTRUCTIONS HERE
910 REM PRINTER/SCREEN
920 CALL CLEAR :: PRINT "POMPEII
": :"WOULD YOU LIKE THE (LONG)
 INSTRUCTIONS ON YOUR TV     SCR
EEN,OR ON YOUR THERMAL   PRINTER
?"
930 PRINT "ENTER TV OR TP";
940 ON ERROR 230 :: INPUT A$ ::
IF A$<>"TP" AND A$<>"TV" THEN 94
0
950 IF A$="TV" THEN 1040
960 REM A$="TP"-PRINTER-FIRST TE
ST!
```

Illustration: Dorian Cross.

```
970 ON ERROR 1030
980 OPEN #1:"TP,U,S,E",OUTPUT ::
 FOR IN=1 TO 300 :: READ A$ :: I
F A$="END" THEN 1020
990 PRINT #1:A$ :: NEXT IN :: CA
LL CLEAR
1000 REM NO MORE
1010 REM
1020 CLOSE #1 :: CALL CLEAR :: O
N ERROR 230 :: GOTO 1080
1030 CALL SOUND(700,440,0):: PRI
NT "CANNOT ACCESS PRINTER" :: FO
R IN=1 TO 800 :: NEXT IN :: RETU
RN 920
1040 CALL CLEAR :: FOR IN=1 TO 3
00 :: READ A$ :: IF A$="END" THE
N 1070
1050 IF IN/18=INT(IN/18)THEN PRI
NT "PRESS ENTER TO CONTINUE" ::
INPUT A$Z :: CALL CLEAR
1060 PRINT A$ :: NEXT IN
1070 REM
1080 REM INPUT NAMES
1090 PRINT "PLAYERS NAMES:MAX 8
CHARS:"
1100 INPUT "PLAYER ONE:":P$(1)::
 IF LEN(P$(1))>8 THEN 1100
1110 INPUT "PLAYER TWO:":P$(2)::
 IF LEN(P$(2))>8 THEN 1110
1115 IF P=0 THEN P=1
1120 GOTO 230
1130 FOR COUNT=1 TO 700 :: NEXT
COUNT :: RETURN
1140 END
1150 DATA POMPEII,BY STEPHEN SHA
W,FOR TEXAS INSTRUMENTS 99/4,AND
  99/4A,IN EXTENDED BASIC
1160 DATA ,THIS GAME IS BASED ON
  GAMING,CHIPS FOUND AT POMPEII,&
  IS COPYRIGHT BY,WHITTLECRAFT,
1170 DATA RULES FROM GAMES & PUZ
ZLES,OCTOBER 1977,,,,,,,,
1180 DATA THE BASIC GAME IS AS F
OLLOWS,THERE IS A BOX WITH TWELV
E,COMPARTMENTS,AND FIFTEEN DOUBL
E SIDED,COUNTERS,WITH ONE SIDE B
LANK AND
1190 DATA THE OTHER WITH A NUMBE
R,,THE FIRST PLAYER THROWS THE,1
5 COUNTERS AND MUST USE THE,NUMB
ERS ON THOSE THAT FALL
1200 DATA NUMBER UP IN ACCORDANC
E WITH,THE FOLLOWING RULES,,,,,
1210 DATA THE VALUE OF ONE COUNT
ER MAY,BE USED TO 'FILL' ONE,COM
PARTMENT,OR THE SUM OR DIFFERENC
E OF,TWO COUNTERS MAY BE USED.
1220 DATA WHEN(IF) ALL FACEUP CO
UNTERS,ARE USED UP,THOSE WHICH I
NITIALLY FELL,BLANK UP ARE RETHR
OWN,AND PLAYER ONE CONTINUES
1230 DATA UNTIL HE CANNOT USE,A
COUNTER OR NO COUNTER,FALLS FACE
 UP,,,,,
1240 DATA WHEN THE FIRST PLAYER
CANNOT,CONTINUE,THE TOTAL VALUE
OF ALL FACE-,UP COUNTERS AND ALL
 UNFILLED,COMPARTMENTS IS ADDED
TO HIS
1250 DATA SCORE,(A LOW SCORE WIN
S) PLAY TERMINATES IN THIS,VERS
ION WHEN AFTER THE SECOND PLAYER
 FINISHES A ROUND ONE PLAYER SCO
RES
1260 DATA OVER 100,,,
1270 DATA IN COMPUTER PLAY THE,C
OUNTERS WILL APPEAR ON THE,LEFT
SIDE OF THE SCREEN,THE COMPARTME
NTS ON THE    . RIGHT
1280 DATA THE PLAYER PLAYING IS,
INDICATED,AND BOTH SCORES.,AT TH
E END OF A PLAYERS TURN,THE SCOR
E FOR THAT TURN IS,FIRST SHOWN
1290 DATA THEN THE TOTAL.,ENTRIE
S MADE WHICH ARE NOT,POSSIBLE WI
LL BE IGNORED,THERE IS NO PENALT
Y.,,,
1300 DATA ENTER THE NUMBER OF TH
E,FIRST COUNTER,THEN  IF ONLY ON
E IS TO BE,USED A '.'-FULL STOP,
IF ANOTHER COUNTER IS TO BE
1310 DATA USED THEN ENTER A + OR
 -,FINALLY ENTER THE VALUE OF,TH
E SECOND COUNTER,,
1320 DATA EG THREE SEPARATE ENTR
IES-,WATCH FOR INPUT PROMPTS,,,,
,,,,
1330 DATA TO THROW AGAIN WHEN YO
U HAVE,USED ALL THE COUNTERS SHO
WN,OR IF YOU CANNOT USE THEM,ALL
   ENTER A 0 (ZERO)
1340 DATA WATCH FOR 'PLAYING',IN
DICATOR AS THE COMPUTER,WILL AUT
OMATICALLY CHANGE,PLAYERS IF ALL
 BLANKS ARE,THROWN,,,,GOOD LUCK
1350 DATA " ",,,,,,,,,POMPEII,,FO
R TI99/4 BY STEPHEN SHAW,1982,IN
 EXTENDED BASIC,,,END,END,END,EN
D
1360 END
```

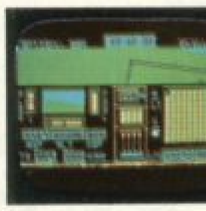
"We will be flying at a height of 30,000 feet. Our air speed will be 500 knots. And there's a fair chance we're going to crash."





No smoking. Fasten your seat belt. You're about to take off in a 747. But on this flight you're the pilot.

You could hardly describe THORN EMI's 'Jumbo Jet Pilot' as simply another video game. It's more like a session in a flight simulator with life-like instrumentation and graphics.



Jumbo Jet Pilot. 16 K ROM. Cartridge. 5 skill levels. Performance rating. Controls: Throttle. Ailerons. Elevators. Undercarriage. Brakes. Stall Indicator. Lights. Fuel. Longitude. Latitude. Air Speed. Artificial Horizon. Altitude. Pitch and Roll. Heading. Vertical Speed. Map Reference and Grid. Time Elapsed.

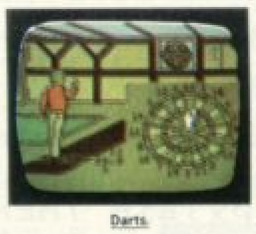
To cope you need to be alert. You should expect the unexpected. And you definitely shouldn't lower the undercarriage when your air speed is dropping and the horizon suddenly appears vertical!

On landing, your in-flight computer will assess your skills and give a 'performance rating'. If you manage to land that is.

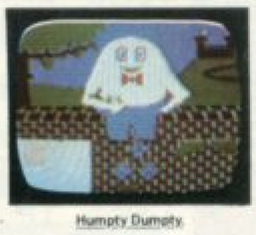
'Jumbo Jet Pilot' is one of 21 challenging new home computer games from THORN EMI. It's pretty demanding. But our programs aren't all work and no play.

'River Rescue', 'Kickback', and 'Soccer,' are all-action games. 'Pool' and 'Darts' will suit armchair sportsmen.

And whilst budding Beethovens play the 'VIC Music Composer,' would-be Chancellors can work on their budgets with 'Home Financial Management'.



Darts.



Humpty Dumpty.

We also have educational puzzles for children that will puzzle adults at higher skill levels. But there's one simple idea behind all our titles; we've designed them for players who are bored with run-of-the-mill TV games.

Now, is that Heathrow ahead? Or is it Hyde Park?

THORN EMI VIDEO

The world's greatest TV games



PROGRAMS FOR ATARI 400/800 [Trademark of Atari Inc. except where indicated].
*PROGRAMS FOR COMMODORE VIC 20 [Trademark of Commodore International].

Available from all branches of Laskys (Nationwide), Micro C at Currys, and all other leading Computer software outlets.

```
190 LET F=0
200 GOSUB 9050
220 LET H$="MINUTES"
225 RAND
230 LET PY=3
240 LET PX=15
250 LET A=1
260 LET P$=" O "
268 LET Q=1
270 LET D=0
280 LET K=0
290 LET A1=1
300 LET A2=1
310 LET A3=2
320 LET A4=1
325 LET T=240
327 IF F=1 THEN GOTO 6670
3000 PRINT AT PY-1,PX;"   "
3010 PRINT AT PY+1,PX+Q;" "
3020 PRINT AT PY,PX;P$
3025 GOSUB (INT (RND*10)*10)+600
0
3027 LET T=T-1
3028 IF T=0 THEN GOTO 6595
3030 LET PY1=PY
3035 LET PX1=PX
3040 IF INKEY$="5" THEN LET PX=P
X-1
3050 IF INKEY$="6" THEN LET PY=P
Y+1
3060 IF INKEY$="7" THEN LET PY=P
Y-1
3070 IF INKEY$="8" THEN LET PX=P
X+1
3075 LET G=3980+10*PY
3080 GOSUB G
3085 GOTO 3000
4000 IF PX<>15 THEN LET PY=3
4002 IF PY<2 THEN LET PY=2
4004 IF PX=15 AND K=1 THEN GOTO
4700
4006 RETURN
4011 IF PX<=8 THEN LET PX=8
4012 IF PX>=22 THEN LET PX=22
4014 RETURN
4020 IF PX<=9 THEN LET PX=9
4022 IF PX>=21 THEN LET PX=21
4024 RETURN
4030 IF PX<=10 THEN LET PX=10
4032 IF PX>=20 THEN LET PX=20
4034 RETURN
4040 IF PX<=11 THEN LET PX=11
4042 IF PX>=19 THEN LET PX=19
4044 RETURN
4050 IF PX<=12 THEN LET PX=12
4052 IF PX>=18 THEN LET PX=18
```

Escape from the Pyramids of Mars

Mars hides many secrets beneath its silent shifting sands. Was there a highly intelligent ancient race which existed on the planet in times long past?

You are a member of a team attempting to solve that mystery. You were on the verge of a great breakthrough after a mysterious pyramid was uncovered by excavations in one of the many Martian deserts — miles from the nearest earth colony. Your mission was to explore this newly unearthed structure.

But on entering you found yourself trapped in the interior of the pyramid. To escape you discovered that you needed four keys from the tomb's inner chamber. But you can only carry one key at a time due to a strange force which surrounds them.

The corridors and key chamber are protected by defence mechanisms still operational after millions of years. And your air supply is running out . . .

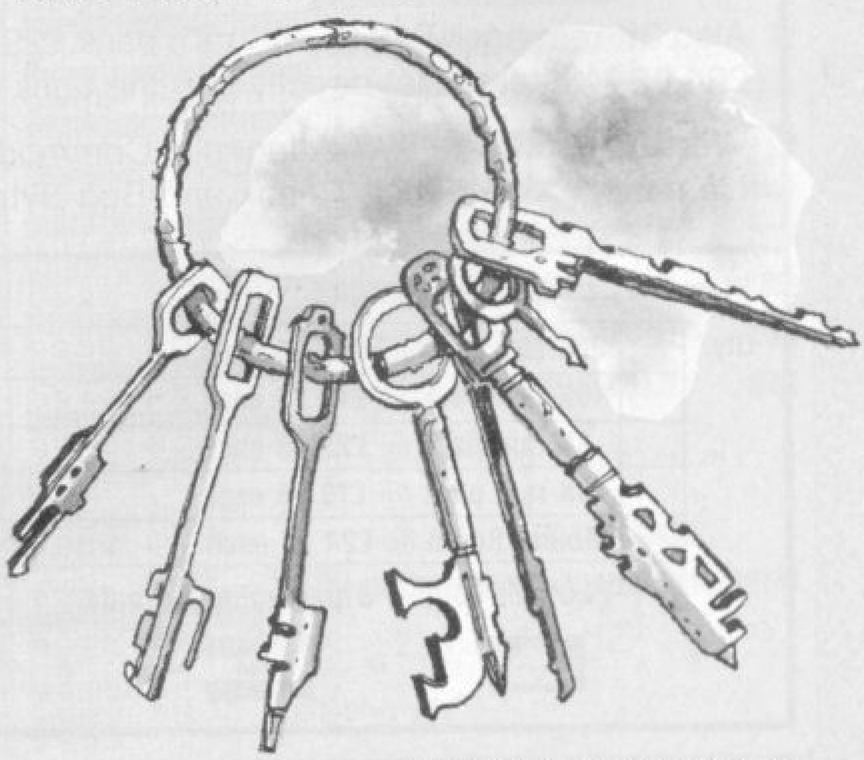


RUNS ON A ZX81 IN 16K

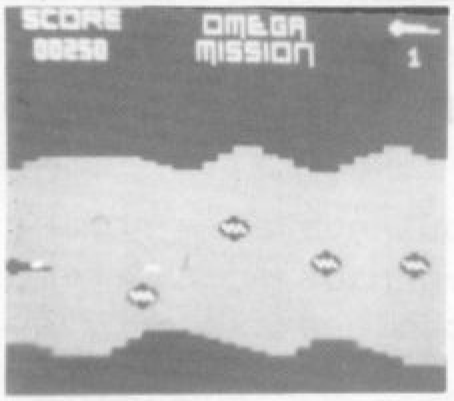
BY DAVID HEALEY

```
4054 RETURN
4060 IF PX<=13 THEN LET PX=13
4062 IF PX>=17 THEN LET PX=17
4064 RETURN
4070 IF PX<=14 THEN LET PX=14
4072 IF PX>=16 THEN LET PX=16
4074 RETURN
4080 IF PX<>15 THEN LET PX=15
4082 RETURN
4090 GOTO 4080
4100 GOTO 4060
4110 GOTO 4080
4115 GOTO 4080
4120 GOTO 4080
4130 GOTO 4080
4150 IF PY=17 AND PX<>15 THEN LE
T PY=PY1
4151 IF PY=17 AND PX<>15 THEN LE
T PX=PX1
4180 IF PY>18 THEN LET PY=10
4181 IF PY<18 AND PX<>15 THEN LE
T PY=18
4182 IF PX<2 THEN LET PX=2
4183 IF PX>28 THEN LET PX=28
4184 IF PX=9 AND A1=1 AND K=0 TH
EN GOTO 4500
4185 IF PX=21 AND A2=1 AND K=0 T
HEN GOTO 4510
4186 IF PX=26 AND A3=1 AND K=0 T
HEN GOTO 4520
4188 IF PX=4 AND A4=1 AND K=0 TH
EN GOTO 4530
4189 IF INKEY$="5" OR INKEY$="7"
 AND PX<>15 THEN RETURN
4200 RETURN
4500 LET A1=0
4505 GOTO 4600
4510 LET A2=0
4515 GOTO 4600
4520 LET A3=0
4525 GOTO 4600
4530 LET A4=0
4535 GOTO 4600
4600 LET K=1
4610 LET P$=" ▓ "
4620 RETURN
4700 LET D=D+1
4710 PRINT AT 0,16;D
4720 LET P$=" O "
4730 IF D=4 THEN GOTO 7000
4735 LET K=0
4740 RETURN
6000 PRINT AT 11,13;"▓ ";AT 11,1
3;"▓▒"
6002 IF PY=11 THEN GOTO 6500
6003 RETURN
6010 PRINT AT 11,18;" ▓";AT 11,1
8;"▒▓"
6012 IF PY=11 THEN GOTO 6500
6013 RETURN
6020 PRINT AT 13,13;"▓ ";AT 13,1
3;"▓▒"
6022 IF PY=13 THEN GOTO 6500
6023 RETURN
6030 PRINT AT 13,18;" ▓";AT 13,1
8;"▒▓"
6032 IF PY=13 THEN GOTO 6500
6033 RETURN
6040 PRINT AT 15,13;"▓ ";AT 15,1
3;"▓▒"
6042 IF PY=15 THEN GOTO 6500
6043 RETURN
6050 PRINT AT 15,18;" ▓";AT 15,1
8;"▒▓"
6052 IF PY=15 THEN GOTO 6500
6053 RETURN
6060 PRINT AT 15,5;"▓";AT 16,5;"
";AT 15,5;"▓";AT 16,5;"▒"
6062 IF PX=4 THEN GOTO 6500
6063 RETURN
6070 PRINT AT 15,10;"▓";AT 16,10
;" ";AT 15,10;"▓";AT 16,10;"▒"
6072 IF PX=9 THEN GOTO 6500
6073 RETURN
6080 PRINT AT 15,22;"▓";AT 16,22
;" ";AT 15,22;"▓";AT 16,22;"▒"
6082 IF PX=21 THEN GOTO 6500
6083 RETURN
6090 PRINT AT 15,27;"▓";AT 16,27
;" ";AT 15,27;"▓";AT 16,27;"▒"
```

```
6092 IF PX=26 THEN GOTO 6500
6093 RETURN
6500 FOR L=1 TO 30
6505 PRINT AT PY,PX;" +";AT PY,P
X;" ▓";AT PY,PX;" ,"
6508 NEXT L
6510 FOR L=1 TO 50
6520 NEXT L
6525 CLS
6530 PRINT "YOU HAVE BEEN ANNIHI
LATED BY THE"
6540 PRINT "PYRAMIDS SELF DEFENC
E MECHANISM"
6550 PRINT "GOOD JOB ITS ONLY A
GAME"
6560 PRINT
6570 PRINT "PRESS N/L FOR ANOTHE
R GAME"
6575 IF INKEY$="" THEN GOTO 6575
6577 LET F=1
6578 CLS
6580 GOTO 220
6585 LET F=0
6590 GOTO 9765
6595 CLS
6600 PRINT "YOU HAVE SUFFOCATED
THROUGH "
6610 PRINT "LACK OF OXYGEN. HARD
 LUCK."
6620 PRINT
6630 PRINT "PRESS N/L FOR ANOTHE
R GAME."
6640 IF INKEY$="" THEN GOTO 6640
6642 LET F=1
6644 CLS
6650 GOTO 220
6660 LET F=0
6670 GOTO 9765
7000 CLS
7005 PRINT AT 6,16;"▟▙"
7010 PRINT AT 7,15;"▟██▙"
7020 PRINT AT 8,14;"▟████▙"
7030 PRINT AT 9,13;"▟██████▙"
7040 PRINT AT 10,12;"▟████████▙"
7050 PRINT AT 11,11;"▟██████████
▙"
7060 PRINT AT 12,10;"▟██████████
██▙"
7070 PRINT AT 13,9;"▟███████████
████▙"
7080 PRINT AT 14,8;"▟███████████
██████▙"
7090 PRINT AT 15,7;"▟███████████
████████▙"
7100 PRINT AT 16,6;"▟███████████
██████████▙"
7110 PRINT AT 17,5;"▟███████████
████████████▙"
7120 PRINT AT 18,4;"▟███████████
██████████████▙"
7130 PRINT AT 19,3;"▟███████████
████████████████▙"
7140 PRINT AT 20,2;"▟███████████
██████████████████▙"
7150 FOR L=1 TO 10
7160 NEXT L
7300 PRINT AT 20,15;"▄▄▄▄▖"
```

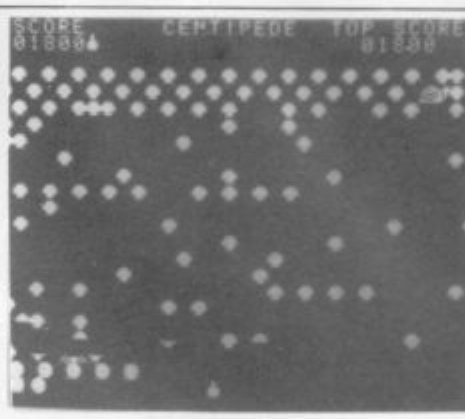


Illustrations: Jon Davis



ATOM

ACTION PACKED M/CODE ARCADE GAMES



OMEGA MISSION £7

The first and only version of the superb Scramble Arcade game. Moving landscape! Fly over mountains, through caves and tunnels. 5 different stages. Ground to Air Missiles, Fire Balls, Space Craft, Mutants and the narrow twisting Tunnel. Movement in 8 directions, laser cannon. Excellent COLOUR graphics (give Black & White on monochrome T.V.) mode 3a, Sound Effects. Top score.



CENTIPEDE £6

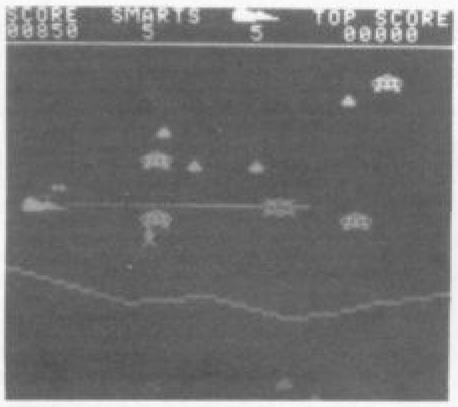
The first and only version of this popular Arcade game for the Atom. Shoot down the splitting centipede as it swirls through the mushroom field. Also inhabiting the game are Spiders, Bugs and Snails. The action increases until only skill and quick thinking can save you. Excellent high speed mode 4 graphics. Sound Effects and Top score.

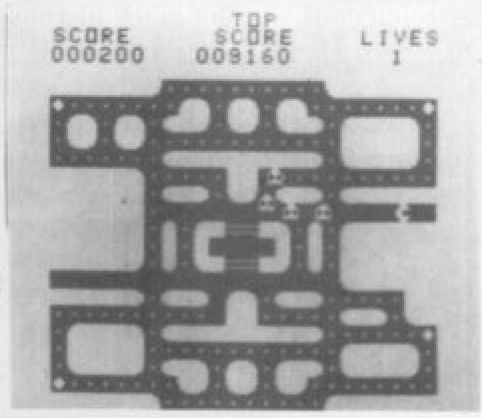
THE PROTECTOR £7

The most realistic version of this amazing Arcade game available for the Atom. Defend your humanoids from mutation and destroy the Aliens in this hyper fast, action packed game. Moving planetary surface, repeating lasers and smart bombs, thrust, sapce, increasing Attack Waves, 6 types of Aliens, Sound Effects. Top score and excellent mode 4 graphics are some of the features in this exciting game.

PUCKMAN £5

One of the best versions of this popular Arcade maze chaser game. Eat all the dots in the maze but watch out for the hungry ghosts! Eat an Energy Blob and the chase reverses. Each maze cleared brings a new one with faster ghosts. Excellent high speed mode 4 graphics, Sound Effects and Top score.





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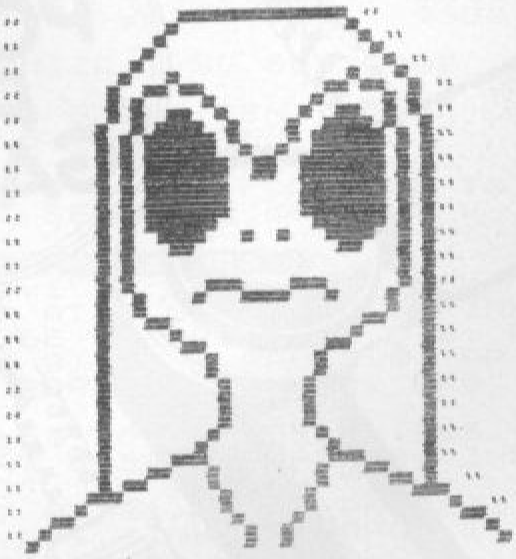
charge my ACCESS or BARCLAYCARD

Account No ______

Name ______

Address ______

```
7303 GOSUB 7400
7305 PRINT AT 20,15;"        "
7310 GOSUB 7400
7320 PRINT AT 19,15;"        "
7330 GOSUB 7400
7340 PRINT AT 19,15;"        "
7350 GOSUB 7400
7360 PRINT AT 18,15;"        "
7370 GOSUB 7400
7380 PRINT AT 18,15;"        "
7395 GOSUB 7400
7397 GOTO 7450
7400 FOR L=1 TO 7
7410 NEXT L
7420 RETURN
7450 PRINT AT 20,17;"  "
7460 PRINT AT 19,17;"  "
7480 PRINT AT 18,17;"  "
7490 PRINT AT 1,0;"YOU ESCAPED T
HE PYRAMID WITH "
7495 IF T=1 THEN LET H$="MINUTE"
7500 PRINT ;T;" ";H$;" OF OXYGEN
 REMAINING"
7510 FOR L=1 TO 150
7520 NEXT L
7530 CLS
7540 PRINT "PRESS N/L FOR ANOTHE
R GAME."
7550 IF INKEY$="" THEN GOTO 7550
7555 CLS
7560 GOTO 1
9050 PRINT "
9055 PRINT "
9060 PRINT "
9065 PRINT "
9070 PRINT "
9075 PRINT "
9080 PRINT "
9085 PRINT "
9090 PRINT "
9095 PRINT "
9100 PRINT "
9110 PRINT "
9120 PRINT "
9130 PRINT "
9140 PRINT "
9150 PRINT "
9160 PRINT "
9170 PRINT "
9180 PRINT "
9190 PRINT "
9200 PRINT "
9210 PRINT "
"
```



```
9220 FOR A=0 TO 20 STEP 4
9230 PRINT AT A,22;"SYNACROOP"
9240 NEXT A
9250 FOR B=1 TO 21 STEP 4
9260 PRINT AT B,22;"SOFTWARE:"
9270 NEXT B
9280 FOR X=1 TO 150
9290 NEXT X
9300 FOR X=1 TO 22
9310 SCROLL
9320 NEXT X
9325 CLS
9330 PRINT "
9340 PRINT "
9350 PRINT "
9360 PRINT "
9370 PRINT "
9380 PRINT "
9390 PRINT "
9400 PRINT
9410 PRINT "                FROM THE
"
9420 PRINT
9430 PRINT "
9440 PRINT "
9450 PRINT "
9460 PRINT "
9470 PRINT
9480 PRINT "
9490 PRINT "
9500 PRINT "
9510 PRINT "
9520 FOR V=1 TO 150
9530 NEXT V
9540 CLS
9550 PRINT "          INSTRUCTIO
NS"
9570 PRINT "   YOU ARE A MEMBER
OF A MARTIAN"
9580 PRINT "EXPLORATION PARTY AN
D HAVE"
9590 PRINT "EXCAVATED SEVERAL PY
RAMID"
9600 PRINT "STRUCTURES ON THE SU
RFACE OF "
9605 PRINT "MARS."
9610 PRINT "   UPON ENTERING YOU
 FIND "
9620 PRINT "YOURSELF TRAPPED IN
THE STRANGE"
9630 PRINT "INTERIOR OF THE PYRA
MID. TO "
9640 PRINT "ESCAPE YOU MUST COLL
ECT FOUR "
9650 PRINT "KEYS FROM THE INNER
CHAMBER ,"
9660 PRINT "CARRY THEM TO THE DO
OR AND"
9670 PRINT "PLACE THEM IN THE SL
OT. YOU CAN"
9680 PRINT "HOWEVER ONLY CARRY O
NE KEY AT A"
9690 PRINT "TIME."
9700 PRINT "   THE CORRIDOR AND
KEYROOM ARE"
9710 PRINT "PROTECTED BY A DEFEN
CE MECHANISM"
9720 PRINT "WHICH CAN KILL YOU I
F YOU ARE"
9730 PRINT "CLOSE WHEN IT IS OPE
RATING."
9740 PRINT "   REMEMBER THAT YOU
R OXYGEN "
9750 PRINT "SUPPLY IS LIMITED, S
O HURRY"
9755 PRINT "PRESS N/L TO CONTINU
E"
9760 IF INKEY$="" THEN GOTO 9760
9765 CLS
9770 PRINT "
9780 PRINT "
9790 PRINT AT 2,0;"        ";AT 2
,26;"      "
9800 PRINT AT 3,0;"        ";AT
3,25;"       "
9810 PRINT AT 4,0;"        ";AT
 4,24;"        "
9820 PRINT AT 5,0;"        ";A
T 5,23;"        "
9830 PRINT AT 6,0;"        ";
AT 6,22;"        "
9840 PRINT
9850 PRINT "
9860 PRINT "
9880 PRINT "
9890 PRINT "
9900 PRINT "
9910 PRINT "
9920 PRINT "
9930 PRINT "
9940 PRINT "
9945 FOR V=17 TO 20
9950 PRINT AT V,0;"  ";AT V,31;"
 "
9955 NEXT V
9960 PRINT AT 20,4;"
9965 PRINT "
9975 PRINT AT 19,5;"$";AT 19,10;
"$";AT 19,22;"$";AT 19,27;"$"
9980 RETURN
9998 SAVE "ONLY "
9999 GOTO 1
```

TANKER

RUNS ON A SPECTRUM IN 16K **BY MIKE LEVER**

A life on the ocean wave can be dangerous. There's always someone lurking around ready to blast your tanker right out of the water!

The object of this game is to knock out as many enemy tankers as possible using your anti-tanker gun — making sure that the vital supplies your warring opponent needs just don't get through.

To give those tanker captains that sinking feeling use keys "Z" to move left, "X" for right and "M" to fire.

```
  10
EM  These lines contain User
   Defined Graphics
  20 REM
        1010, 1020, 1030, 1050,
        1120, 2010, and   9330

 100 RANDOMIZE : GO SUB 9000: RE
M usr chrs
 110 GO SUB 9300: REM instr
 120 GO SUB 8000: REM vars
 130 GO SUB 8500: REM screen
 140 FOR n=1 TO 3: FOR o=50 TO 2
0 STEP -5: BEEP .01,o: NEXT o: N
EXT n
 150 REM  Here we go!
1000 FOR a=1 TO no
1010 PRINT AT 8,0; PAPER 6; INK
0;"G": PAUSE 5: PRINT AT 8,0; PA
PER 6; INK 0;"FG": PAUSE 5: PRIN
T AT 8,0; PAPER 6; INK 0;"EFG":
PAUSE 5
1020 FOR b=1 TO 29: BEEP .005,-1
5: PRINT AT 8,b-1; PAPER 6; INK
0;" ";"EFG"
1030 PRINT AT 21,pos1; PAPER 1;"
  ";AT 21,pos; INK 7; PAPER 1;"A
B": LET pos1=pos: LET i=CODE INK
EY$: LET pos=pos+(i=120 AND pos<
27)-(i=122 AND pos>3): IF NOT f
THEN IF i=109 THEN LET f=1: LET
fp=pos: LET xfp=20: BEEP .01,30
1040 IF NOT f THEN GO TO 1100
1050 PRINT AT xfp+1,fp; PAPER 1;
"  " AND xfp<>20;AT xfp,fp; INK
7;"CD": IF xfp=9 THEN GO TO 2000
1060 LET xfp=xfp-1: GO TO 1110
1100 FOR n=1 TO 4: NEXT n
1110 NEXT b
1120 PRINT AT 8,29; PAPER 6; INK
 0;" EF": PAUSE 5: PRINT AT 8,30
; INK 0; PAPER 6;" E": PAUSE 5:
PRINT AT 8,31; PAPER 6;" ": LET
m=m+1: GO SUB 8510
1140 FOR n=20 TO 40 STEP 10: BEE
P .1,n: NEXT n: NEXT a
1150 IF f THEN PRINT AT xfp+1,fp
; PAPER 1;"  "
1160 FOR n=1 TO 100: NEXT n
1170 PRINT AT 12,11; INK 1;"GAME
  OVER": INK 6: OVER 1: FOR x=10
3 TO 8 STEP -1: PLOT 0,x: DRAW 2
55,0: BEEP .005,x/2: NEXT x: OVE
R 0
1190 INK 2: PRINT AT 14,1; FLASH
 1; PAPER 6;"PRESS ANY KEY FOR A
NOTHER GAME"
1200 IF INKEY$="" THEN FOR n=30
TO 50: BEEP .005,n: NEXT n: GO T
O 1200
1210 RUN 120
2000 IF fp<b OR fp>b+2 THEN LET
f=0: PRINT AT 9,fp; PAPER 1;"  "
: GO TO 1110
2010 PRINT AT xfp,fp; PAPER 1;"
 ": FOR n=6 TO 10: FOR p=1 TO 5:
 PRINT AT 8,b; PAPER 6; INK p;"E
FG": BEEP .01,n*p: NEXT p: NEXT
n: FOR n=40 TO 50: PRINT AT 8,b;
 PAPER 6; INK 2; OVER 1;"HHH": B
EEP .01,n: PRINT AT 8,b; PAPER 6
; OVER 1;"   ": BEEP .01,55-n: N
EXT n: PRINT AT 8,b; PAPER 6;"
 ": LET h=h+1: PAUSE 30: GO SUB
8510: LET f=0: GO TO 1140
8000 LET h=0: LET m=0
8010 LET pos=14: LET f=0: LET po
s1=pos
8020 LET no=INT (RND*15)+10
8400 RETURN
8500 BORDER 3: INK 7: PAPER 1: B
RIGHT 1: CLS : PRINT PAPER 3; FL
ASH 1;" *TANKER* "; FLASH 0; BRI
GHT 0;"  HITS:     MISSES:    ";
FOR x=1 TO 8: PRINT PAPER 6,,: N
EXT x: PRINT AT 21,0; PAPER 3; B
RIGHT 0; INK 1;"  ▜";AT 21,29;"▛
"
8510 PRINT AT 0,17; BRIGHT 0; PA
PER 3; INK 7;h;AT 0,28;m
8520 RETURN
9000 RESTORE 9100
9010 FOR x=0 TO 7
9020 FOR y=0 TO 7: READ z: POKE
USR (CHR$ (97+x))+y,z: NEXT y
9030 NEXT x
9040 RETURN
9100 DATA BIN 00000011,BIN 00000
011,BIN 00000011,BIN 00000011,BI
N 00000111,BIN 00011111,BIN 0111
1111,255
9110 DATA BIN 11000000,BIN 11000
000,BIN 11000000,BIN 11000000,BI
N 11100000,BIN 11111000,BIN 1111
1110,255
9120 DATA 0,1,1,1,3,1,3,0
9130 DATA 0,BIN 10000000,BIN 100
00000,BIN 10000000,BIN 11000000,
BIN 10000000,BIN 11000000,0
9140 DATA 0,BIN 00000100,BIN 000
00100,BIN 00000110,BIN 00001111,
BIN 01111111,BIN 00111111,BIN 00
011111
9150 DATA 0,0,0,0,BIN 10101000,2
55,255,255
9160 DATA 0,0,0,0,0,BIN 11111110
,BIN 11111100,BIN 11111000
9170 DATA 0,0,0,BIN 10010010,BIN
 01010100,0,BIN 01010100,BIN 100
10010
9300 PAPER 0: INK 7: BRIGHT 1: B
ORDER 0: CLS
9310 PRINT INVERSE 1;"  TANKER
 by Mike Levers © 1982 "
9320 PRINT '" The object of this
 simple game"''"is to knock out
as many enemy"''"tankers as poss
ible using your"''"anti - tanker
 (GROAN!) gun,"
9330 PRINT '"which looks like th
is: AB ."''" To move your gun us
e key Z"''"for left and X for ri
ght. To"''"fire press M."
9340 PRINT '' FLASH 1;"     PRES
S ANY KEY TO BEGIN     "
9350 IF INKEY$="" THEN INK INT (
RND*4+4): OVER 1: FOR n=0 TO 19:
 PRINT AT n,0,,: NEXT n: OVER 0:
 GO TO 9350
9360 BEEP .5,10: RETURN
```

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VCCVG 02/83



"Computerised scrumping! Whatever will they think of next? In my day we had to get out among the apple trees for a bit of fruity fun. And there was always the gamekeeper to keep an eye out for. If he caught you you'd know all about it! All these computerised chappies have to worry about is dropping apples!"

The game is set outside the tall ivy clad wall of an orchard. You are waiting at the bottom of the wall holding a basket on your head. Your computer "accomplice" will throw apples over the wall at random positions. All you have to do is catch as many as you can.

When you have caught 15 apples the game stops momentarily and the computer tells you it has found something to help you. A trestle is drawn on the screen and you hop up onto it. The game continues but you have less time to catch the falling apples.

The trestle drawing routine is continued each time you collect 15 apples in your basket, moving you progressively further up the screen, giving you less and less time to catch the falling fruit.

Once you have missed 10 apples the game stops and the computer tells you your score — a chance to have another crack at those apples!

Variables:

YI: vertical position of basket.
Y: vertical position of man.
XI: horizontal position of basket and man.
APP: number of apples caught.
MISS: number of apples missed.
Q: limit of fall of apples in FOR/NEXT loop.
Z: determines level change (increase by 15 each level).
X: random horizontal position of falling apples.
L: control flag (equals 1 or 10).

The '}' character is a clear screen command (ESC. CTRL. CLEAR) and it appears in lines 10, 100, 2155.

Type line 2155 exactly as it is for correct screen format.

Lines 3050, 3070, 5100, 5130, 5140, 5160, 5340 should have the words between quotation marks typed in INVERSE video.

Also lines 5010-5070 should have the "'s typed in alternate INVERSE video. In line 5250 type 21 CONTROL M's (underlining).





RUNS ON AN ATARI 400/800 IN 16K

over the orchard wall

BY PETER AND MARK WRIGHT

```
1 REM OVER THE ORCHARD WALL BY PETER & M
ARK WRIGHT AUGUST 1982.
3 GOSUB 5000
4 Q=79:Z=15
7 GOSUB 1000:GOTO 10
8 GOSUB 1002
10 ? "}WE'VE GOT ";APP;" APPLES SO FAR"
15 IF APP>=15 THEN 750
20 POKE 704,52:POKE 705,218:COLOR 1:PLOT
 0,15:DRAWTO 159,15
25 X=INT(RND(1)*120)+15:POKE 53278,0
29 REM MAIN PLAYING LOOP
30 FOR I=18 TO Q:B=STICK(0)
35 SOUND 0,I+11,10,8
40 COLOR 3:PLOT X,I:DRAWTO X+2,I:COLOR 0
:PLOT X,I-2:DRAWTO X+2,I-2
42 IF B=15 THEN POKE HPOSP0,X1:POKE HPOS
P1,X1:GOTO 50
44 IF B=11 AND X1>=67 THEN X1=X1-2:POKE
HPOSP0,X1:POKE HPOSP1,X1:SOUND 1,0,1,8:G
OTO 50
46 IF B=7 AND X1<=177 THEN X1=X1+2:POKE
HPOSP0,X1:POKE HPOSP1,X1:SOUND 1,0,1,8:G
OTO 50
50 IF PEEK(53252)<>0 THEN APP=APP+1:GOTO
 600
60 IF I=Q THEN MISS=MISS+1:IF MISS=10 TH
EN 3000
70 COLOR 1:IF I=Q THEN GOSUB 150
71 SOUND 1,0,0,0:NEXT I
74 REM CHECKS FOR NEXT LEVELS
75 IF APP=15 AND L=0 THEN ? "HOLD ON A M
INUTE, I'VE FOUND A PLANK":SOUND 0,0,0,0
:L=1:GOTO 100
80 IF APP=Z THEN ? "HOLD ON A MINUTE, I'
VE FOUND ANOTHER":? "PLANK":SOUND 0,0,0,
0:GOTO 100
90 GOTO 25
100 FOR I=1 TO 2000:NEXT I:Q=Q-10:Z=Z+15
:Y=Y-20:Y1=Y1-20:? "}":GOTO 8
149 REM SOUND AND TEXT WINDOW INFORMATIO
N
150 FOR J=1 TO 5:SOUND 0,150,12,14:NEXT
J:FOR J=14 TO 0 STEP -1:SOUND 0,150,10,J
:NEXT J:RETURN
600 FOR N=I TO I-2 STEP -1:COLOR 0:PLOT
X,N:DRAWTO X+2,N:NEXT N:I=83:POKE 53278,
0
605 FOR J=1 TO 5:SOUND 0,40,10,14:NEXT J
:FOR J=14 TO 0 STEP -1:SOUND 0,40,10,J:N
EXT J
610 POKE 656,0:? "WE'VE GOT ";APP;" SO F
AR, GREAT 'IN IT!!!!":GOTO 71
749 REM PLANK AND TRESTLE DRAWING ROUTIN
ES
750 COLOR 1:PLOT 0,71:DRAWTO 159,71:PLOT
 0,70:DRAWTO 159,70
760 PLOT 20,70:DRAWTO 25,79:PLOT 20,70:D
RAWTO 15,79:PLOT 140,70:DRAWTO 145,79:PL
OT 140,70:DRAWTO 135,79
770 IF APP=15 THEN 20
780 COLOR 1:PLOT 0,61:DRAWTO 159,61:PLOT
 0,60:DRAWTO 159,60
790 PLOT 20,60:DRAWTO 25,69:PLOT 20,60:D
RAWTO 15,69:PLOT 140,60:DRAWTO 145,69:PL
OT 140,60:DRAWTO 135,69
800 IF APP=30 THEN 20
810 COLOR 1:PLOT 0,51:DRAWTO 159,51:PLOT
 0,50:DRAWTO 159,50
820 PLOT 20,50:DRAWTO 25,59:PLOT 20,50:D
RAWTO 15,59:PLOT 140,50:DRAWTO 145,59:PL
OT 140,50:DRAWTO 135,59
830 IF APP=45 THEN 20
840 COLOR 1:PLOT 0,41:DRAWTO 159,41:PLOT
 0,40:DRAWTO 159,40
850 PLOT 20,40:DRAWTO 25,49:PLOT 20,40:D
RAWTO 15,49:PLOT 140,40:DRAWTO 145,49:PL
OT 140,40:DRAWTO 135,49
860 IF APP=60 THEN 20
870 COLOR 1:PLOT 0,31:DRAWTO 159,31:PLOT
 0,30:DRAWTO 159,30
880 PLOT 20,30:DRAWTO 25,39:PLOT 20,30:D
RAWTO 15,39:PLOT 140,30:DRAWTO 145,39:PL
OT 140,30:DRAWTO 135,39
890 IF APP=75 THEN 20
900 GOTO 20
999 REM PLAYER/MISSILE GRAPHICS SET UP
1000 GRAPHICS 7:X1=125:Y=172:Y1=180
1002 GRAPHICS 7+32:COLOR 1:SETCOLOR 2,12
,4:SETCOLOR 4,0,6:SETCOLOR 0,14,4:POKE 7
52,1:X1=125
1004 POKE 656,1:POKE 657,11:? "HANG ON A
 MINUTE!"
1005 POKE 704,6:POKE 705,6
1010 A=PEEK(106)-24:POKE 54279,A:PMBASE=
256*A
1020 POKE 559,62
1030 POKE 53277,3
1040 POKE HPOSP0,X1:POKE HPOSP1,X1
1050 FOR J=PMBASE+1024 TO PMBASE+1470:PO
KE J,0:NEXT J
1070 FOR J=PMBASE+1024+Y TO PMBASE+1032+
Y:READ A:POKE J,A:NEXT J
1080 DATA 255,255,255,255,126,126,126,12
6,60
1090 FOR I=PMBASE+1280+Y1 TO PMBASE+1290
+Y1:READ A:POKE I,A:NEXT I
1100 DATA 195,153,153,255,60,60,60,60,10
2,102,231
1110 POKE 623,1
1140 RESTORE
1999 REM PLAYFIELD SET UP
2000 SETCOLOR 1,9,8:COLOR 2:PLOT 159,13:
DRAWTO 159,0:DRAWTO 0,0
2010 POSITION 0,14:POKE 765,2:XIO 18,#6,
0,0,"S:"
2015 COLOR 3:PLOT 4,14:DRAWTO 17,14
2020 PLOT 5,13:DRAWTO 15,13:PLOT 6,12:DR
AWTO 14,12:PLOT 9,11:DRAWTO 11,11:PLOT 1
0,10:DRAWTO 12,10
2030 COLOR 2:PLOT 7,13:PLOT 10,12
2035 COLOR 3:PLOT 47,14:DRAWTO 78,14:PLO
T 49,13:DRAWTO 77,13
2040 PLOT 50,12:DRAWTO 75,12:PLOT 53,11:
```

Illustration: Terry Rogers



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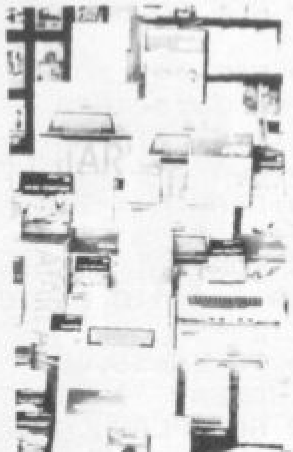
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```
DRAWTO 74,11:PLOT 58,10:DRAWTO 72,10
2050 PLOT 60,9:DRAWTO 71,9:PLOT 63,8:DRA
WTO 70,8:PLOT 64,7:DRAWTO 68,7:PLOT 65,6
:DRAWTO 68,6
2060 COLOR 2:PLOT 63,9:PLOT 70,9:PLOT 67
,6:PLOT 65,10:PLOT 72,11:PLOT 49,14:PLOT
 49,14:PLOT 53,13:PLOT 58,13
2070 COLOR 3:PLOT 110,14:DRAWTO 125,14:P
LOT 112,13:DRAWTO 124,13:PLOT 115,12:DRA
WTO 123,12
2080 PLOT 118,11:DRAWTO 121,11:PLOT 119,
10:DRAWTO 121,10
2090 PLOT 140,14:DRAWTO 150,14:PLOT 141,
13:DRAWTO 148,13:PLOT 143,12:DRAWTO 148,
12:PLOT 146,11:DRAWTO 149,11
2100 PLOT 147,10:DRAWTO 150,10
2110 COLOR 2:PLOT 114,14:PLOT 123,14:PLO
T 114,13:PLOT 120,13:PLOT 119,12:PLOT 12
1,11:PLOT 144,13:PLOT 148,12
2120 PLOT 146,11:PLOT 142,14:IF L=1 THEN
 RETURN
2130 COLOR 3:FOR I=15 TO 79:T=INT(RND(1)
*15):PLOT 0,I:DRAWTO T,I:NEXT I
2140 COLOR 2:PLOT 4,34:PLOT 7,76:PLOT 4,
18:PLOT 6,25
2150 COLOR 3:FOR I=15 TO 80:T=INT(RND(1)
*20)+140:PLOT 159,I:DRAWTO T,I:NEXT I
2155 ? "}HERE WE ARE OUTSIDE THE ORCHARD
.IF YOUDROP 10 APPLES I'M NOT PLAYING "
2157 ? "PRESS RETURN WHEN YOU'RE READY";
:INPUT A$
2160 RETURN
2999 REM END ROUTINE
3000 POKE 656,0:POKE 657,0:? "
                                       "
3002 ? "YOU'VE MISSED 10 APPLES":SOUND 0
,0,0,0:FOR I=1 TO 1000:NEXT I
3007 POKE HPOSP0,5:POKE HPOSP1,5
3010 GRAPHICS 2+16:SETCOLOR 1,9,8:? #6:?
 #6
3020 ? #6;"     you caught"
3030 POSITION 9,4:? #6;APP
3040 POSITION 7,6:? #6;"apples"
3050 POSITION 4,8:? #6;"ANOTHER GAME?"
3070 POSITION 6,9:? #6;"(y or n)"
3090 SETCOLOR 2,0,8:SETCOLOR 0,11,8
3100 FOR C=1 TO 50:NEXT C
3110 SETCOLOR 2,11,8:SETCOLOR 0,0,8
3120 FOR C=1 TO 50:NEXT C
3130 IF PEEK(764)=43 THEN POKE 764,255:A
PP=0:L=0:MISS=0:GOTO 4
3140 IF PEEK(764)=35 THEN 3160
3150 GOTO 3090
3160 GRAPHICS 2+16:SETCOLOR 0,7,8
3170 FOR I=0 TO 11:POSITION 2,I:? #6;"CH
ICKEN  CHICKEN":SOUND 0,145+I*10,10,10
3180 FOR N=1 TO 50:NEXT N:SOUND 0,0,0,0:
NEXT I
3190 SOUND 0,0,0,0:GOTO 3190
4999 REM OPENING TITLES AND INSTRUCTIONS
5000 GRAPHICS 17:DIM A$(1):HPOSP0=53248:
HPOSP1=53249
5005 ? #6:? #6
5010 ? #6;"  ****************"
5020 ? #6;"  *              *"
5030 ? #6;"  *   over the   *"
5040 ? #6;"  *              *"
5050 ? #6;"  * orchard wall *"
5060 ? #6;"  *              *"
5070 ? #6;"  ****************"
5080 ? #6
5090 ? #6;"          BY":? #6
5100 ? #6;"PETER & MARK WRIGHT"
5110 ? #6:? #6:? #6:? #6
5120 ? #6;
5130 ? #6;"   do you require"
5140 ? #6;"   instructions ?"
5150 ? #6
5160 ? #6;"         (y or n)"
5170 SETCOLOR 2,15,8:SETCOLOR 0,11,8
5180 FOR J=1 TO 50:NEXT J
5190 SETCOLOR 0,15,8:SETCOLOR 2,11,8
5200 FOR J=1 TO 50:NEXT J
5210 IF PEEK(764)=43 THEN 5240
5220 IF PEEK(764)=35 THEN POKE 764,255:R
ETURN
5230 GOTO 5170
5240 POKE 764,255:GRAPHICS 0:SETCOLOR 2,
13,2:SETCOLOR 4,14,4
5250 ? :? "OVER THE ORCHARD WALL":? "<21
 CTRL M>"
5260 ? "Young Albert Atari has managed t
o ":? "climb the ivy clad orchard wall,
and"
5270 ? "has disappeared inside.":? :? "
  He will throw the apples over the"
5280 ? "wall. You must try and catch as
many":? "as you can in the basket that A
lbert"
5290 ? "has provided.":? :? "(You can mo
ve left or right by using":? "a joystick
 in the left hand socket)"
5300 ? :? "   Every time you catch 15 ap
ples,":? "Young Albert will try and make
 it"
5310 ? "easier for you??????":? :? "    S
ee how many apples you can catch"
5320 ? "before Albert gets annoyed at th
e":? "number of apples you miss."
5330 ? :? "PRESS RETURN TO START GAME
      ";:INPUT A$
5340 RETURN
```

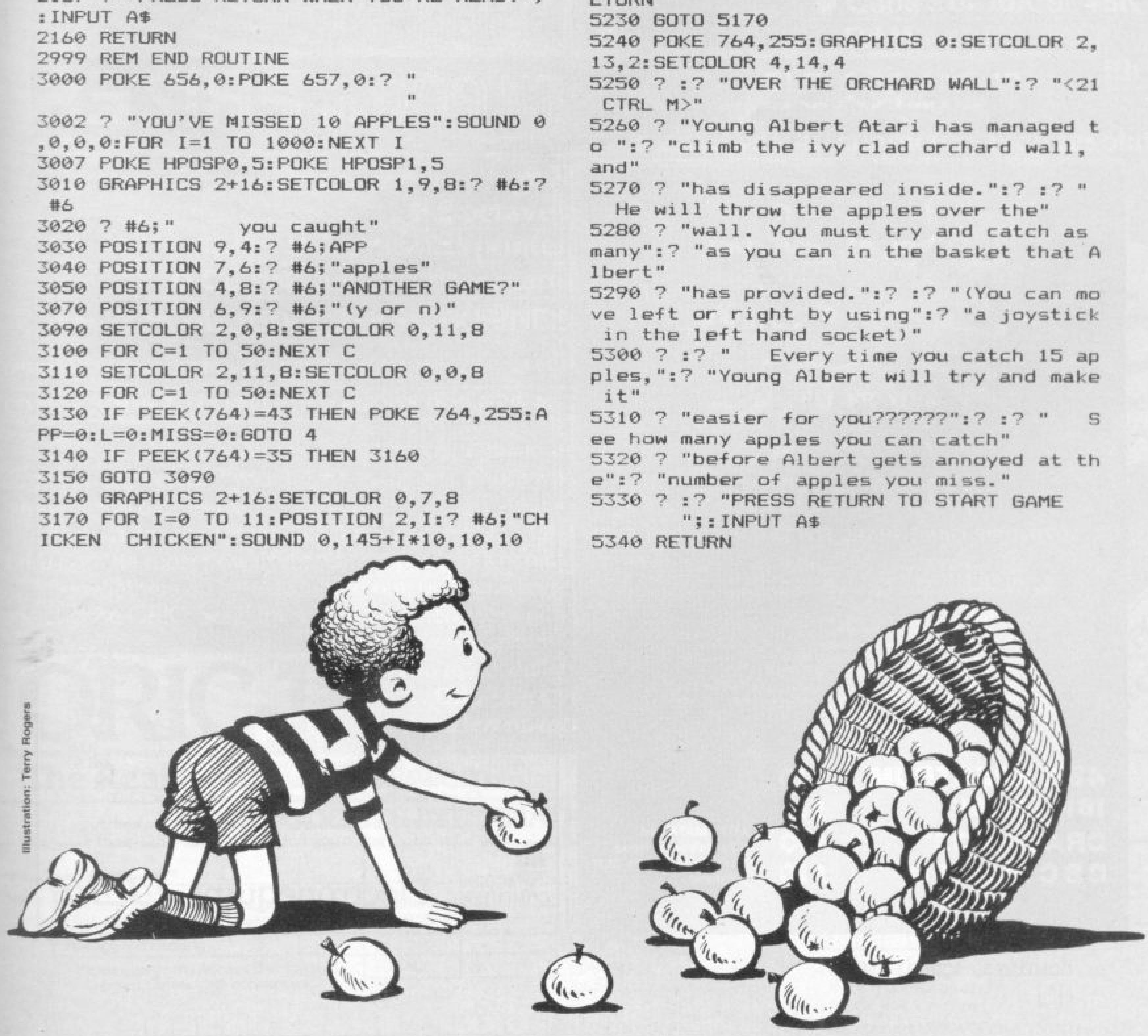


Illustration: Terry Rogers

ZX81 16K · SPECTRUM 16/48 · DRAGON TRS COLOR · TANDY LEVEL 2 · BBC A/B

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AWARI

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★ Select the 'Witch-doctor' level and it's a threat to your sanity. We haven't beaten it and we wrote it!

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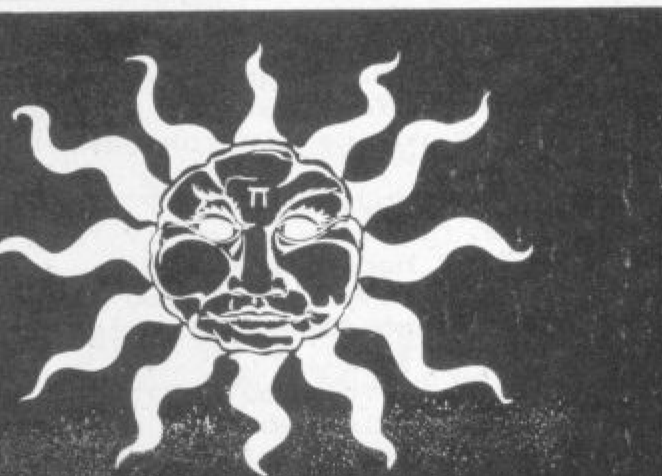
★ No random elements — you will need skill, cunning and a sense of humour as you explore caves, forest and castles.

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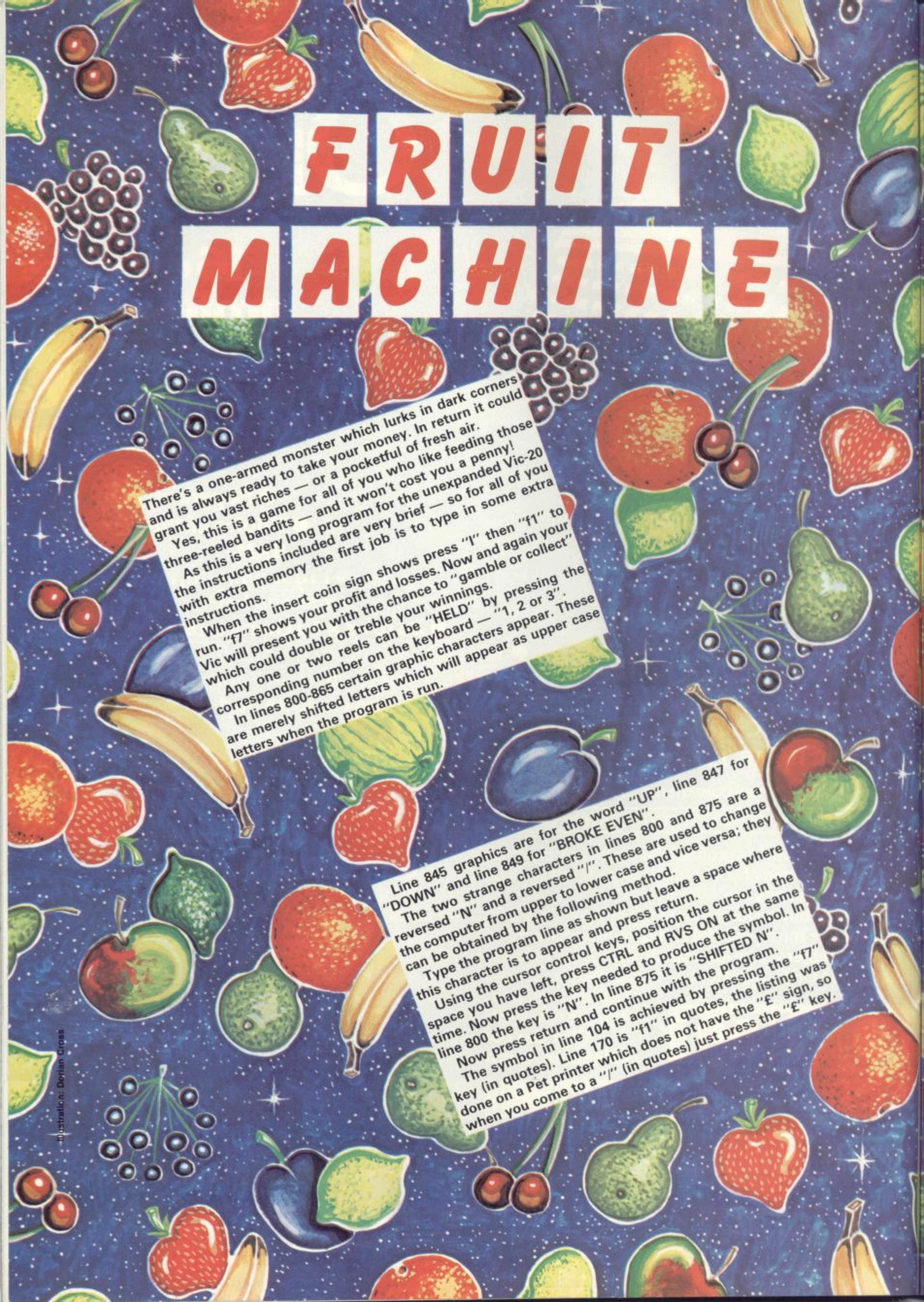
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FRUIT MACHINE

There's a one-armed monster which lurks in dark corners and is always ready to take your money. In return it could grant you vast riches — or a pocketful of fresh air.

Yes, this is a game for all of you who like feeding those three-reeled bandits — and it won't cost you a penny!

As this is a very long program for the unexpanded Vic-20 the instructions included are very brief — so for all of you with extra memory the first job is to type in some extra instructions.

When the insert coin sign shows press "I" then "f1" to run. "f7" shows your profit and losses. Now and again your Vic will present you with the chance to "gamble or collect" which could double or treble your winnings.

Any one or two reels can be "HELD" by pressing the corresponding number on the keyboard — "1, 2 or 3".

In lines 800-865 certain graphic characters appear. These are merely shifted letters which will appear as upper case letters when the program is run.

Line 845 graphics are for the word "UP", line 847 for "DOWN" and line 849 for "BROKE EVEN".

The two strange characters in lines 800 and 875 are a reversed "N" and a reversed "/". These are used to change the computer from upper to lower case and vice versa; they can be obtained by the following method.

Type the program line as shown but leave a space where this character is to appear and press return.

Using the cursor control keys, position the cursor in the space you have left, press CTRL and RVS ON at the same time. Now press the key needed to produce the symbol. In line 800 the key is "N". In line 875 it is "SHIFTED N".

Now press return and continue with the program.

The symbol in line 104 is achieved by pressing the "f7" key (in quotes). Line 170 is "f1" in quotes, the listing was done on a Pet printer which does not have the "£" sign, so when you come to a "/" (in quotes) just press the "£" key.

Illustration: Dorian Cross

```
1 C2$="▮▮▮▮▮▮▮":H$=CHR$(13):C3$="▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮":CH$=H$+H$+C2$:SR=36875:CC$="▮▮▮▮▮▮▮▮▮▮":POKESR-1,15:GOTO20
2 SO=SR-3:DIMS$(15):Q=RND(-TI)
3 S$(R)="▮*":GOTO145
4 S$(R)="▮*":GOTO145
5 S$(R)="▮π":GOTO145
6 S$(R)="▮*":GOTO145
7 S$(R)="▮*":GOTO145
8 S$(R)="▮*":GOTO145
9 S$(R)="▮*":GOTO145
20 RN=1:GOSUB125
21 POKESR,13:PRINT"▮▮▮         FRUIT MACHINE.          ";
22 PRINT"▮▮▮▮▮▮▮▮  1  ▮▮  2  ▮▮  3  ":PRINTFM$H$FM$
23 FM$="▮▮ ▮▮▮ ▮▮ ▮▮▮ ▮▮ ▮▮▮ "
25 PRINT"▮▮─▮▮▮─▮▮─▮▮▮─▮▮─▮▮▮─"H$FM$H$FM$
28 PRINT"▮▮  1  ▮▮  2  ▮▮  3   ":GOTO35
30 IFIS<1THENPRINT"▮▮▮▮         INSERT COIN.
32 PRINT"▮▮▮▮▮▮▮▮▮▮PRESS F1"
35 PRINT"▮▮▮▮▮▮▮▮▮▮▮▮▮ I=INSERT COIN (10P)"H$"▮ F1=SPIN REELS"
40 PRINT"▮ F7=CHECK PROGRESS":HA=1:GOSUB500
50 IFIS=1THEN115
100 POKE198,0
102 GETE$:IFE$=""THEN102
104 IFE$="▮"THEN800
106 IFE$<>"I"THEN100
108 IN=IN+10:IS=2
115 PRINT"▮▮▮▮▮▮▮▮▮  PRESS F1      ":POKE198,0:GOTO160
125 FORR=1TO15
140 ONINT(RND(1)*23)+1GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5,8,8,3,4,3,4
145 IFRLTHENRETURN
150 NEXT
155 IFRNTHENRETURN
160 P=0:K=INT(RND(1)*3)+1
165 IFK=2THENPRINTC3$;"▮▮HOLD▮▮▮HOLD▮▮▮HOLD▮"
170 GETG$:IFG$="▮"THEN187
171 IFK<>2THEN170
172 IFG$="1"ANDR1=0THENR1=1:PRINTC3$;"▮HOLD":GOTO179
174 IFG$="2"ANDR2=0THENR2=1:PRINTC3$;"▮▮▮▮▮▮▮▮HOLD":GOTO179
176 IFG$="3"ANDR3=0THENR3=1:PRINTC3$;"▮▮▮▮▮▮▮▮▮▮▮▮▮▮HOLD":GOTO179
177 GOTO170
179 POKESO,200:FORI=1TO200:NEXT:POKESO,0:IFR1+R2+R3=3THENR1=0:R2=0:R3=0:K=2:GOTO165
182 GOTO170
187 PRINT"▮▮▮▮▮▮▮▮▮▮▮▮"
190 CN=INT(RND(1)*20)+8
195 PRINT"▮▮▮"
200 FORPZ=1TOCN
250 FORX=0TO10STEP5
260 IFR1ANDX=0THEN320
270 IFR2ANDX=5THEN320
280 IFR3ANDX=10THEN320
```

RUNS ON AN UNEXPANDED VIC-20

BY RICHARD LEYSHON

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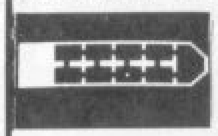
Ten games in Basic for 16k ZX81

Cassette Two contains Reversi, Awari, Laser Bases, Word Mastermind, Rectangles, Crash, Roulette, Pontoon, Penny Shoot and Gun Command.
Cassette 2 costs £5.

CASSETTE 3

8 programs for 16k ZX81

STARSHIP TROJAN



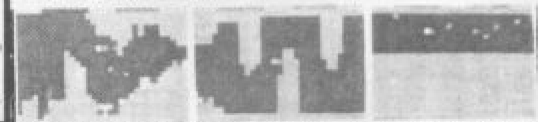
Repair your Starship before disaster strikes. Hazards include asphyxiation, radiation, escaped biological specimens and plunging into a Supernova.

STARTREK This version of the well known space adventure game features variable Klingon mobility, and graphic photo torpedo tracking.
PRINCESS OF KRAAL
An adventure game.
BATTLE Strategy game for 1 to 4 players.
KALABRIASZ World's silliest card game, full of pointless complicated rules.
CUBE Rubik Cube simulator, with lots of functions including 'Backstep'.
SECRET MESSAGES This message coding program is very txlp qexi jf.
MARTIAN CRICKET A simple but addictive game (totally unlike Earth cricket) in machine code. The speed is variable, and its top speed is very fast.
Cassette 3 costs £5.

CASSETTE 4

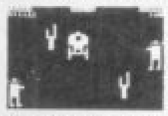
8 games for 16k

ZX-SCRAMBLE (machine code)

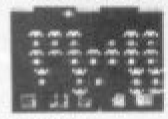


Bomb and shoot your way through the fortified caves.

GUNFIGHT (machine code)



INVADERS (machine code)



FUNGALOIDS (machine code)
GALAXY INVADERS (machine code)
Fleets of swooping and diving alien craft.
SNAKEBITE (machine code)
Eat the snake before it eats you. Variable speed (very fast at top speed)
LIFE (machine code)
A ZX81 version of the well known game.
3D TIC-TAC-TOE (Basic)
Played on a 4×4×4 board, this is a game for the brain. It is very hard to beat the computer at it.
7 of the 8 games are in machine code, because this is much faster than Basic. (Some of these games were previously available from J. Steadman).

Cassette 4 costs £5.

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```
FORY=4TO1STEP-1:S$(Y+X+1)=S$(Y+X):NEXT
300 FORY=4TO1STEP-1:S$(Y+X+1)=S$(Y+X):NEXT
310 R=X+1:RL=1:GOSUB140
320 NEXT
500 PRINTCC$;:FORI=1TO5:PRINTS$(I)"";:NEXT
520 PRINTCC$;C2$;:FORI=6TO10:PRINTS$(I)"";:NEXT:RN=0
540 PRINTCC$;C2$;C2$;:FORI=11TO15:PRINTS$(I)"";:NEXT
550 IFPZ<>CNTHENNEXT
560 IFHATHENHA=0:RETURN
600 P2=7837:S1=PEEK(P2):S2=PEEK(P2+7):S3=PEEK(P2+14)
602 IFS1=42ANDS2=S1ANDS3=S1THENX=10000:GOTO900
605 IFS1=90ANDS2=90ANDS3=90THENX=1500:GOTO900
607 IFS1=90ANDS2=90ANDS3=42THENX=500:GOTO900
610 IFS1=88ANDS2=S1ANDS3=S1ORS1=94ANDS2=S1ANDS3=S1THENX=400:GOTO900
615 IFS1=90ANDS2=S1THENX=350:GOTO900
617 IFS1=83ANDS2=S1ANDS3=S1THENX=300:GOTO900
620 IFS1=42ANDS2=S1ORS2=42ANDS3=S2THENX=250:GOTO900
630 IFS1=88ANDS2=S1ANDS3=42ORS1=94ANDS2=S1ANDS3=42THENX=200:GOTO900
640 IFS1=88ANDS2=S1ORS2=88ANDS3=S2THENX=30:GOTO900
650 IFS1=94ANDS2=S1ORS2=94ANDS3=S2THENX=30:GOTO900
660 IFS1=42ORS2=42ORS3=42THENX=10:GOTO900
670 IFS1=S2ANDS2=S3THENX=20:GOTO900
700 R1=0:R2=0:R3=0:IS=IS-1:IFIS<1ANDPTHEN21
710 IFIS<1THEN30
712 IFPTHEN21
720 GOTO115
800 POKESR,90:PRINT"OU HAVE PUT INTO ME"
805 IFIN<91THENPRINTH$;IN;"P":GOTO820
810 PRINT"\"IN/100;:IFIN/100=INT(IN/100)THENPRINT".00":GOTO820
815 PRINT""
820 PRINTH$;"OU HAVE WON BACK";H$
830 IFOT<91THENPRINTOT;"P":GOTO845
840 PRINT"\"OT/100;:IFOT/100=INT(OT/100)THENPRINT".00":GOTO845
842 PRINT""
845 IFOT>IN THENPRINT"OU ARE ":GOTO855
847 IFOT<IN THENPRINT"OU ARE ":GOTO855
849 PRINTH$;"OU HAVE ":GOTO860
855 R=ABS(IN-OT):IFR<91THENPRINTH$;R;"P":GOTO860
857 PRINTH$;"\"R/100;:IFR/100=INT(R/100)THENPRINT".00":GOTO860
858 PRINT""
860 PRINTH$;"RESS  TO CONTINUE"
865 PRINT"NY OTHER KEY TO END"
867 POKE198,0
870 GETB$:IFB$=""THEN870
875 IFB$="C"THENPRINT"":GOTO21
880 SYS8
900 FORA=1TO25:FORB=185TO240STEP2:POKESO,B:NEXTB:POKESO,0
910 FORB=1TO30:NEXTB,A:POKESO,0:POKE198,0
920 PRINT"AMBLE OR OLLECT?"
930 GETG$:IFG$<>"G"ANDG$<>"C"THEN930
935 PRINT"
940 IFG$="C"THENOT=OT+X:X=0:GOTO700
960 POKESR,234:PRINT""CH$"NOTHING"CH$"EVEN"CH$"NOTHING"CH$"DOUBLE"
970 PRINTH$C2$"NOTHING"CH$"TREBLE"
980 W=7819:FORSD=1TOINT(RND(1)*25)+5:PUKEW,PEEK(W)+128:FORI=1TO100:NEXT
990 POKEW,PEEK(W)-128:W=W+44:IFW>8058THENW=7819
1000 NEXT:POKEW,PEEK(W)+128
1010 IFPEEK(W)=133THENOT=OT+X
1020 IFPEEK(W)=132THENOT=OT+2*X
1030 IFPEEK(W)=148THENOT=OT+3*X
1040 FORI=1TO3000:NEXT:X=0:P=1:GOTO700
```

RUNS ON A DRAGON

IN 32K

BY A. CHAPMAN

MISSILE

```
10 REM****MISSILE COMMAND******
20 REM***********BY*************
30 REM*********A.CHAPMAN*********
50 DIM CI$(7)
60 HI=0
70 DIM A(20),B(20),C(4),M(3),M1(3)
80 R=5:NI=1
90 S=0
100 FOR N=1 TO 250 STEP 10:SOUND N,1:NEXT N
110 C(1)=0:C(2)=0:C(3)=0:C(4)=0
120 K=0:FOR N=1 TO 4:IF C(N)=1 THEN K=K+1:NEXT N
130 IF K=4 THEN 780
140 FOR N=1 TO 250 STEP 10:SOUND N,1:NEXT N
150 A1=127:B1=91:A=127:B=91:M(1)=3:M(2)=3:M(3)=3
    :M1(1)=42:M1(2)=127:M1(3)=212
160 FOR N=1 TO NI:B(N)=1:A(N)=RND(256)-1:NEXT N
170 PMODE 1,1:SCREEN 1,0:PCLS1
180 '******set up screen*******
190 LINE(0,180)-(255,192),PSET,BF
200 C$="U"
210 CI$(1)="C4BM32,180;E10;F10":CI$(2)="C4
    BM117,180;E10;F10":CI$(3)="C4;BM202,18
0;E10;F10"
220 CI$(4)="C4;BM61,180;U8;R20;D8":CI$(5)
    ="C4;BM91,180;U8;R20;D8":CI$(6)="C4;BM1
46,180;U8;R20;D8":CI$(7)="C4;BM177,180;U8;R20;D8"
230 FOR N=4 TO 7
240 IF C(N-3)=1 THEN 260
250 DRAW CI$(N)
260 NEXT N
270 DRAW CI$(1):DRAW CI$(2):DRAW CI$(3)
280 FOR N=1 TO NI:IF A(N)=-1 THEN 310
290 PSET(A(N),B(N),3):B(N)=B(N)+1
    :A(N)=A(N)+RND(2)-RND(2)
300 IF A(N)<0 THEN A(N)=0
305 IF A(N)>255 THEN A(N)=255
310 NEXT N
320 B$=INKEY$
```

THE cities of planet Tanith are peaceful places with some of the most beautiful buildings in any city of the Sol system. But that peace will soon be shattered and the graceful sky towers will soon be burning — unless you can halt the deadly rain of missiles heading toward the planet from the depths of space where a hostile power is lurking . . .

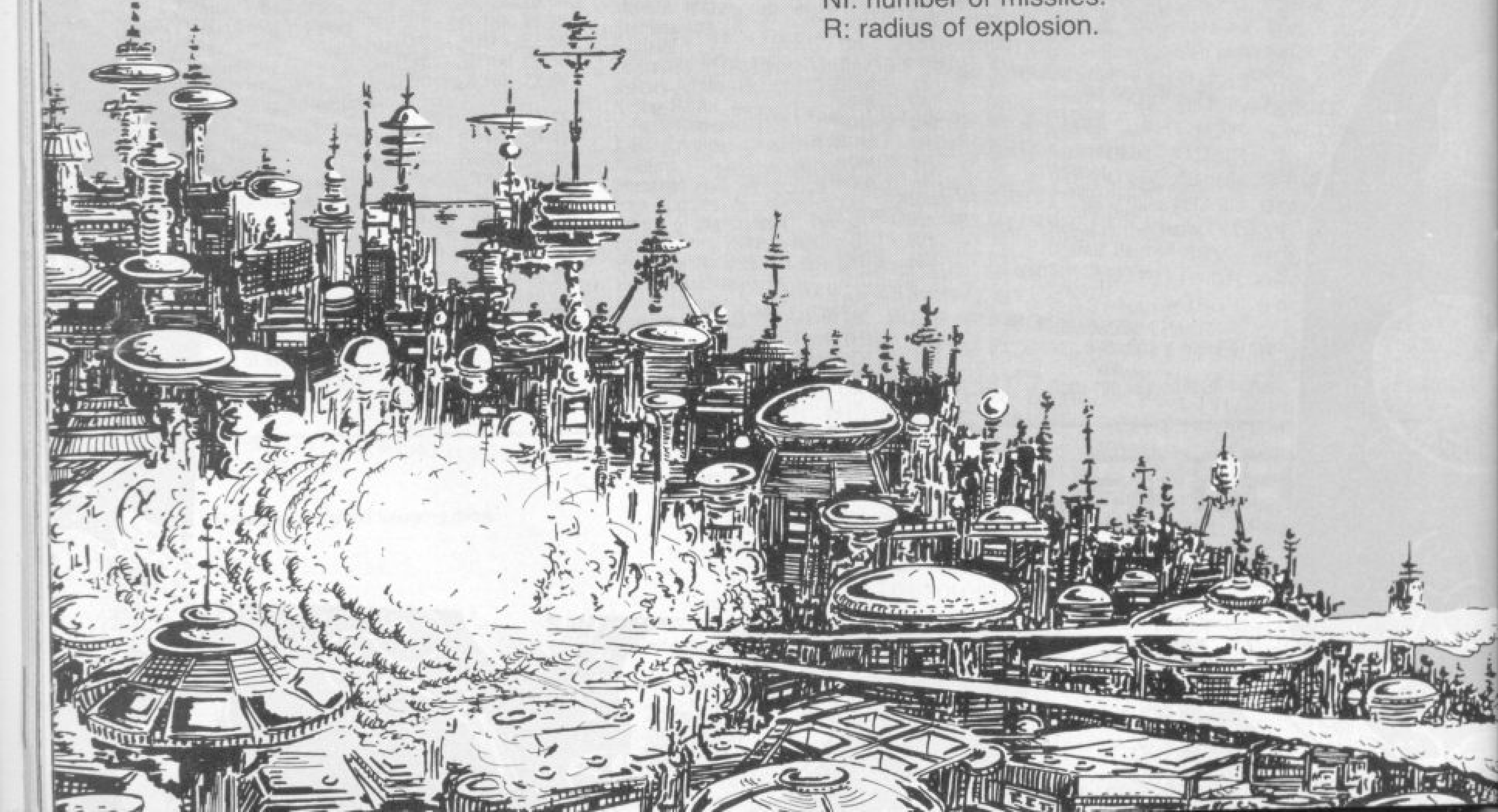
This game for the new Dragon is an adaptation of the video favourite. It's got all the features of the arcade game and should test even the best Missile Commanders.

Line the oncoming missiles up in the sights of your anti-missile laser and blast away. Don't let any get through to destroy your planet's cities.

Use keys 1, 2 and 3 to fire and keys U-up, H-left, J-right, N-down to move your laser-sight.

Variables

CI$(N): contains information for drawing bases and cities.
HI: high score.
A(N),B(N): x,y co-ordinates of missiles.
C(N): whether city destroyed (1) or built (0).
A,B,A1,B1: position of laser-sight.
M(N): number of missiles in base N.
M1(N); x co-ordinates of top of bases.
B$,C$: movement.
S: score.
NI: number of missiles.
R: radius of explosion.



COMMAND

```
330 IF B$="J"OR B$="H"OR B$="U"OR B$="N"THEN 350
340 B$=C$
350 C$=B$
360 IF B$="J"THEN A=A+5:IF A>255 THEN A=255
370 IF B$="H"THEN A=A-5:IF A<0 THEN A=0
380 IF B$="N"THEN B=B+5:IF B>170 THEN B=170
390 PSET(A1,B1,1)
400 PSET(A,B,2)
410 A1=A:B1=B
420 SOUND 155,1
430 IF B$="U"THEN B=B-5:IF B<10 THEN B=10
440 A$=INKEY$:IF A$="1"OR A$="2"OR A$="3"THEN 500
450 FOR N=1 TO NI:IF A(N)=-1 THEN 490
460 IF B(N)<170 THEN 490
470 IF B(N)>190 THEN A(N)=-1
480 GOSUB 570
490 NEXT N:GOTO 640
500 U=VAL(A$):IF M(U)=0 THEN 450
510 SOUND 200,5
520 M(U)=M(U)-1
530 LINE(M1(U),170)-(A,B),PSET:CIRCLE(A,B),R,2
540 FOR N=1 TO NI:IF A(N)=-1 THEN 560
550 P=PPOINT(A(N),B(N)):IF P=2 THEN S=S+10:A(N)=-1
560 NEXT N:CIRCLE(A,B),R,1:LINE(M1(U),170)-(A,B),PRESET:GOTO 450
570 IF A(N)>30 AND A(N)<54 THEN M(1)=0:DRAW"C1;BM32,180;E10;F10":A(N)=-1:RETURN
580 IF A(N)>58 AND A(N)<82 THEN C(1)=1:DRAW"C1;BM61,180;U8;R20;D8":A(N)=-1:RETUR
N
590 IF A(N)>88 AND A(N)<112 THEN C(2)=1:DRAW"C1;BM91,180;U8;R20;D8":A(N)=-1:RETU
RN
600 IF A(N)>116 AND A(N)<141 THEN M(2)=0:DRAW"C1;BM117,180;E10;F10":A(N)=-1:RETU
RN
610 IF A(N)>143 AND A(N)<167 THEN C(3)=1:DRAW"C1;BM146,180;U8;R20;D8":A(N)=-1:RE
TURN
620 IF A(N)>174 AND A(N)<198 THEN C(4)=1:DRAW"C1;BM177,180;U8;R20;D8":A(N)=-1:RE
TURN
630 IF A(N)>199 AND A(N)<223 THEN M(3)=0:DRAW"C1;BM202,180;E10;F10":A(N)=-1:RETU
RN
635 RETURN
640 W1=0
650 FOR N=1 TO NI
660 IF A(N)=-1 THEN W1=W1+1
670 NEXT N
680 IF W1<NI THEN 280
690 PCLS:'YOU'VE GOT 'EM ALL
700 '**BONUS**
710 PLAY"V15T10O3ABGBGAAGGBABG"
720 FOR N=1 TO 4:IF C(N)=0 THEN S=S+100:NEXT N
730 FOR N=1 TO 3:IF M(N)=1 THEN S=S+50:NEXT N
740 NI=NI+1
750 IF N(I)>20 THEN NI=20
760 FOR N=1 TO 2000:NEXT N
770 RESTORE:GOTO 120
780 IF S<HI THEN 840
790 CLS 1
800 PRINT"YOU HAVE ACHIEVED THE HIGH SCORE"
810 HI=S
820 PRINT:PRINT:PRINT"OF ";HI;" POINTS"
    :GOTO 890
830 FOR N=1 TO 2000:NEXT N
840 CLS 1
850 PRINT"YOUR SCORE IS ";S
860 PRINT:PRINT
870 PRINT"THE HIGH SCORE IS ";HI
880 PRINT:PRINT
890 PRINT"PRESS A KEY FOR A GAME OF"
    :PRINT"  **MISSILE COMMAND**"
900 IF INKEY$=""THEN 900 ELSE 80
```

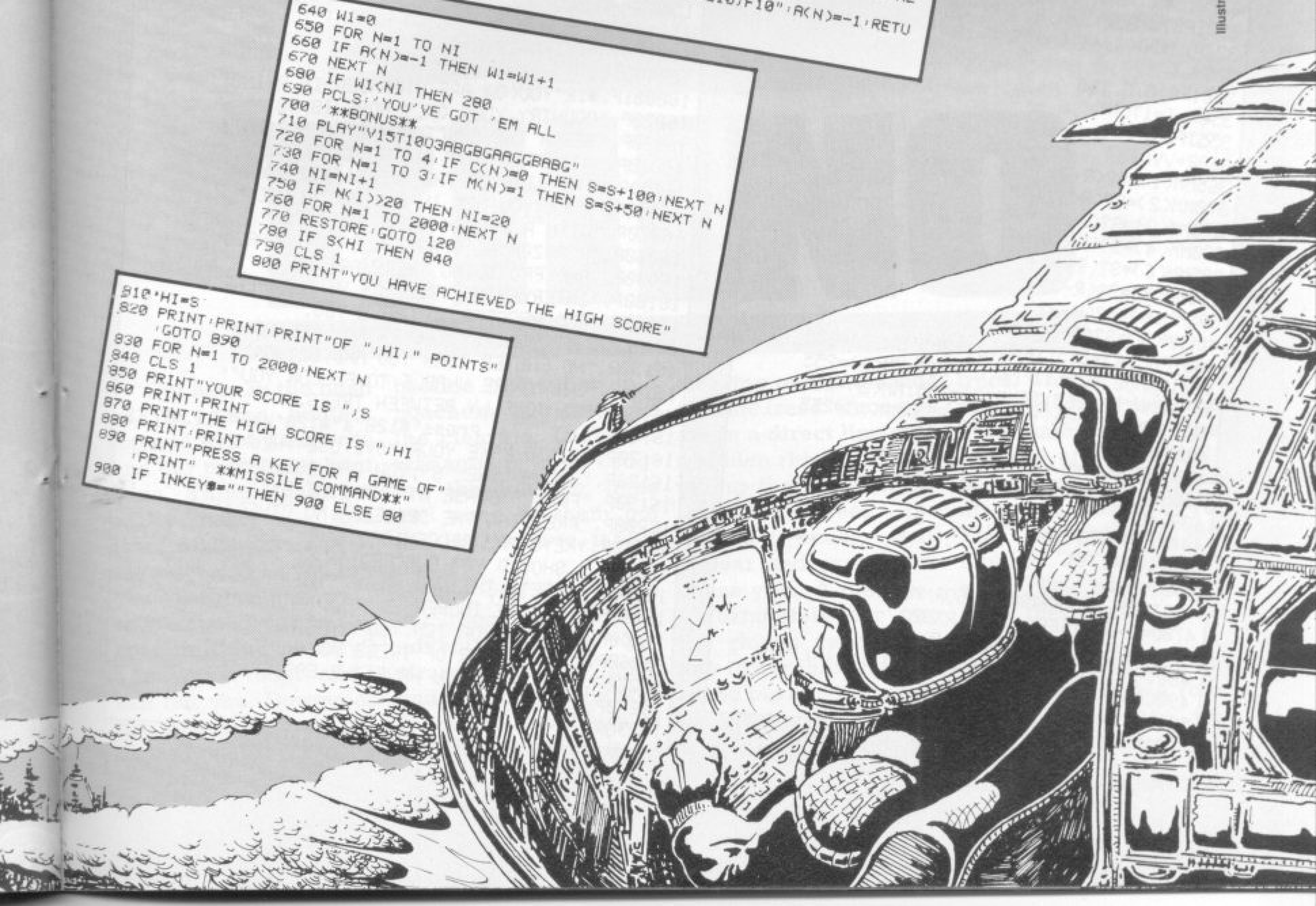


Illustration: Dorian Cross

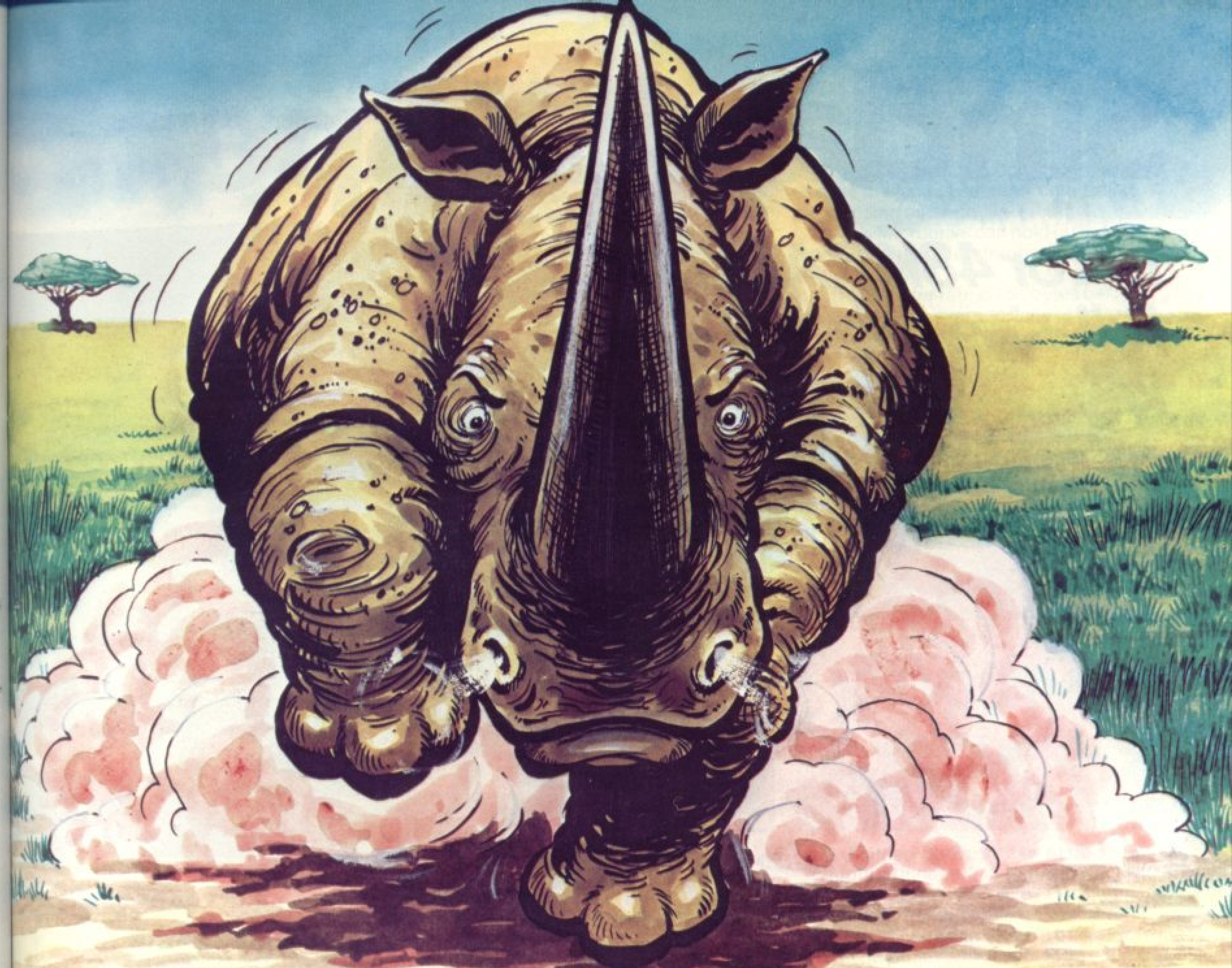
```
1DIMMM(10),VV(10),DD(10),
T(11),RR(2),P(-1)
2P.$21
3[
4:RR1STX#80;RTS
5:RR0JSR#FFE3
6LDX@10
7:RR2CMPT,X;BEQRR1
8DEX;BPLRR2;BMIRR0
9RTS
10]
11P.$6
12$T=" ZXCASDQWE"
15S=#8000
16N=1
17GOS.i
18sIN.'"HOW MANY TREES
(1-200)",O;IFO>200;O=200
19P.$12;?#E1=0
20F.J=1TOO
30X=A.R.%480+32
35IFS?X=255;G.30
40S?X=255
50N.
60S!60=#40404040
70S!92=#40884040
80S!124=#40404040
90S!416=#40404040
100S!448=#40404040
110S!480=#4040400F
111X=480
120F.I=1TO10;VV(I)
=0;DD(I)=0;MM(I)=0;N.
121@=0
140F.I=1TON
142R=A.R.%447+32
144IFS?R=255G.142
146VV(I)=R;N.I
```

```
147IFN=1;P."THERE IS 1 RHINO";G.149
148P."THERE ARE ",N," RHINOS"
149P.$30;F.J=0TO5000;N.              ",$30
150P."your",$128,"go
152LI.RR0
154P."            ",$30
155W=?#80
160GOS.(2000+W*1000)
250S?X=15
252IFX=94;G.15000
300Q=0
305F.I=1TON
310IFDD(I)=1;G.325
315R=VV(I)
317U=R%32;V=R/32;E=X%32;G=X/32
320IFU<>E;IFV<>G;IFA.(U-E)<>A.(V-G);G.325
321K=32*SGN(G-V)+SGN(E-U)
322F.J=R TO X S.K
323IFS?J=255;J=X;N.J;G.325
324N.J;DD(I)=1;Q=1;S?R=18
325N.I
330IFQ>0;G.150
350F.I=1TON
355IFDD(I)=0;G.570
360R=VV(I)
365MM(1)=S?(R+31)
370MM(2)=S?(R+32)
375MM(3)=S?(R+33)
380MM(4)=S?(R-1)
385MM(6)=S?(R+1)
390MM(7)=S?(R-33)
395MM(8)=S?(R-32)
400MM(9)=S?(R-31)
405IFMM(4)=255;IFMM(8)=255;MM(7)=255
410IFMM(8)=255;IFMM(6)=255;MM(9)=255
415IFMM(6)=255;IFMM(2)=255;MM(3)=255
420IFMM(2)=255;IFMM(4)=255;MM(1)=255
425K=R;Y=R
430U=R%32;V=R/32;E=X%32;G=X/32
435A=A.(U-E);B=A.(V-G);Z=A*A+B*B
439L=0
440F.J=32TO-32S.-32
450F.M=-1TO1
455L=L+1
460IFMML=255ORMML=136ORMML=18;G.n
470D=R+J+M;IFA.(D%32-R%32)
    =31ORD<32ORD>511;G.n
480IFMML=15;M=1;J=-32;I=N;N.;N.;N.;G.w
490GOS.r
500nN.;N.
```

```
560S?K=32;S?Y=18;R=Y
565VV(I)=R
570N.I
600G.150
1000rU=D%32;V=D/32
1030A=A.(U-E);B=A.(V-G);C=A*A+B*B
1040IFC<Z;Z=C;Y=D
1050R.
1500wS!(X-2)=#0D010817
1510F.J=0TO5000;N.
1520P.$12
1530P."PRESS A KEY TO GO AGAIN";LI.#FFE3
1550G.s
2000P.$12,"YOU RESIGN!"'
2010P."PRESS ANY KEY TO GO AGAIN";LI.#FFE3;G.s
3000IFS?(X+31)=255;R.
3010IFX%32=0ORX/32>=15;R.
```

```
3020S?X=32;X=X+31
3030R.
4000IFS?(X+32)=255;R.
4010IFX/32>=15;R.
4020S?X=32;X=X+32
4030R.
5000IFS?(X+33)=255;R.
5010IFX%32=31ORX/32>=15;R.
5020S?X=32;X=X+33
5030R.
6000IFS?(X-1)=255;R.
6010IFX%32=0;R.
6020S?X=32;X=X-1
6030R.
7000R.
8000IFS?(X+1)=255;R.
8010IFX%32=31;R.
8020S?X=32;X=X+1
8030R.
9000IFS?(X-33)=255;R.
9010IFX%32=0ORX/32=1;R.
9020S?X=32;X=X-33
9030R.
10000IFS?(X-32)=255;R.
10010IFX/32=1;R.
10020S?X=32;X=X-32
10030R.
11000IFS?(X-31)=255;R.
11010IFX%32=31ORX/32=1;R.
11020S?X=32;X=X-31
11030R.
```

```
15000P.$12,"PHEW,MADE IT!"'
15010P."PRESS A KEY TO GO AGAIN!";LI.#FFE3
15030N=N+1;IFN>10;N=10
15040G.s
16000iP.$12"YOU(O) ARE STRANDED IN RHINO"'
16020P."COUNTRY.YOUR ONLY HOPE IS TO"'
16030P."REACH THE SANCTUARY OF A HUT(h)"'
16040P."SITUATED IN A CLEARING ON THE"'
16050P."FAR SIDE OF THE TREES("$223")."'
16060P."ONCE YOU ARE IN A DIRECT LINE"'
16070P."WITH A HIDDEN RHINO (EITHER"'
16080P."HORIZONTAL,VERTICAL OR DIAGONAL)"
16090P."AND PROVIDING THERE ARE NO"'
16100P."INTERVENING TREES,IT WILL APPEAR"
16110P."AND PROCEED TO CHASE YOU."'
16120P."FORTUNATELY,THE RHINOS CAN MOVE"'
16130P."NO FASTER THAN YOU AND,BEING"'
16140P."BULKY,ARE UNABLE TO FOLLOW YOU"'
16150P."DIAGONALLY BETWEEN TREES."'
16160P."           Press"$128"a"$128"key";LI.#FFE3
16170P.$12"TO MAKE YOUR MOVE,USE THE KEYS"'
16180P."AROUND THE 'S'.YOU CAN RESIGN"'
16190P."FROM A CHASE AT ANY TIME BY"'
16200P."PRESSING THE SPACEBAR.NO OTHER"'
16210P."KEYS ARE RECOGNISED."'
16220P." SHOULD YOU SUCCEED IN REACHING"'
16230P."SAFETY,THE NUMBER OF RHINOS"'
16240P."WILL BE INCREASED BY ONE,UP TO A"'
16250P."MAXIMUM OF TEN.YOU MAY CHOOSE"'
16260P."THE NUMBER OF TREES YOU WANT."'
16270P."THE MORE YOU HAVE,THE EASIER THE"
16280P."GAME."
16290R.
```



RHINO

RUNS ON AN ATOM IN 12K BY R. M. ANDREWS

"Out here in the bush us big game hunters have to live by our wits and our trusty elephant guns. Things can get really nasty — and more often than not — they do! Did I ever tell you about the time I was trapped out in the open in Rhino country? That was a tough one I can tell you. Dozens of the brutes came running at me as I made a beeline for that old poachers hut down in the clearing. Luckily I managed to keep dodging through the trees and none of them got me. But, by jove, it was close!"

Now you can relive our hunter's exciting adventure. You are stranded in the bush and your only hope is to reach the sanctuary of a hut situated in a clearing on the far side of some trees. Once you are in a direct line with a hidden rhino, and providing there are no intervening trees the horned beast will appear and proceed to chase you.

Fortunately for you the rhinos cannot run any faster than you and being big and bulky are unable to follow you diagonally through the trees. Should you succeed in reaching the hut unmolested the number of rhinos will be increased by one — up to a maximum of 10. You may choose the number of trees you want. The more there are the easier the game.

Full instructions on how to deal with a runaway Rhino are included in the program.

Illustration: Terry Rogers

rum



The ZX Printer – available now

Designed exclusively for use with the Sinclair ZX range of computers, the printer offers ZX Spectrum owners the full ASCII character set – including lower-case characters and high-resolution graphics.

A special feature is COPY which prints out exactly what is on the whole TV screen without the need for further instructions. Printing speed is 50 characters per second, with 32 characters per line and 9 lines per vertical inch.

The ZX Printer connects to the rear of your ZX Spectrum. A roll of paper (65ft long and 4in wide) is supplied, along with full instructions. Further supplies of paper are available in packs of five rolls.

The ZX Microdrive – coming soon

The new Microdrives, designed especially for the ZX Spectrum, are set to change the face of personal computing by providing mass on-line storage.

Each Microdrive can hold up to 100K bytes using a single interchangeable storage medium.

The transfer rate is 16K bytes per second, with an average access time of 3.5 seconds. And you'll be able to connect up to 8 Microdrives to your Spectrum via the ZX Expansion Module.

A remarkable breakthrough at a remarkable price. The Microdrives will be available in the early part of 1983 for around £50.





ZX Spectrum software on cassettes – available now

The Spectrum software library is growing every day. Subjects include games, education, and business/household management. Flight Simulation...Chess...Planetoids...History...Inventions...VU-CALC...VU-3D ...Club Record Controller...there is something for everyone. And they all make full use of the Spectrum's colour, sound, and graphics capabilities. You'll receive a detailed catalogue with your Spectrum.

ZX Expansion Module

This module incorporates the three functions of Microdrive controller, local area network, and RS232 interface. Connect it to your Spectrum and you can control up to eight Microdrives, communicate with other computers, and drive a wide range of printers.

The potential is enormous, and the module will be available in the early part of 1983 for around £30.

sinclair

**Sinclair Research Ltd, Stanhope Road, Camberley, Surrey GU15 3PS.
Tel: Camberley (0276) 685311.**

How to order your ZX Spectrum

BY PHONE – Access, Barclaycard or Trustcard holders can call 01-200 0200 for personal attention 24 hours a day, every day. BY FREEPOST – use the no-stamp needed coupon below. You can pay by cheque, postal order, Barclaycard, Access or Trustcard.

EITHER WAY – please allow up to 28 days for delivery. And there's a 14-day money-back option, of course. We want you to be satisfied beyond doubt – and we have no doubt that you will be.

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	Sinclair ZX Spectrum – 48K RAM version	101	175.00	
	Sinclair ZX Printer	27	59.95	
	Printer paper (pack of 5 rolls)	16	11.95	
	Postage and packing: orders under £100	28	2.95	
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KRAZY KONG

BY TIMOTHY BOONE

RUNS ON A PET IN 8K

Kong. Now there's a name to conjour with. And that's just what we've done. At least one of our readers has, and has come up with a version of the famous arcade game.

Tim says his game is a very close copy of the arcade game's fourth screen — the most difficult and popular.

If you have not played the arcade version before then you'll need an introduction to our gorilla friend. The basic idea is that Kong has captured the beautiful heroine and taken her to the top of the Empire State Building.

Then Jump-Man — so called because of his amazing jumping prowess — comes to the rescue. Jump-Man has to rush to the top of the building and save the girl from the gruesome gorilla.

This game takes part in the attic section of the building. Jump-Man has to knock out the roof supports and send Kong crashing to his doom. There are eight supports and Jump-Man can knock them out by walking — or jumping — over them.

But there is a catch. These supports are each guarded by four moving fireballs — which also burn away the top and bottom rungs of Jump-Man's ladders. If you knock out all the plugs you'll get a bonus.

You start out with three lives and can lose these in many ways — as you'll find out. If you manage to conquer Kong the program loops and you get another chance to challenge him.

Tim says his game is a very close copy of the arcade game's fourth screen — the better?

J = position of Jump-Man; SC = Score including the bonuses (D).

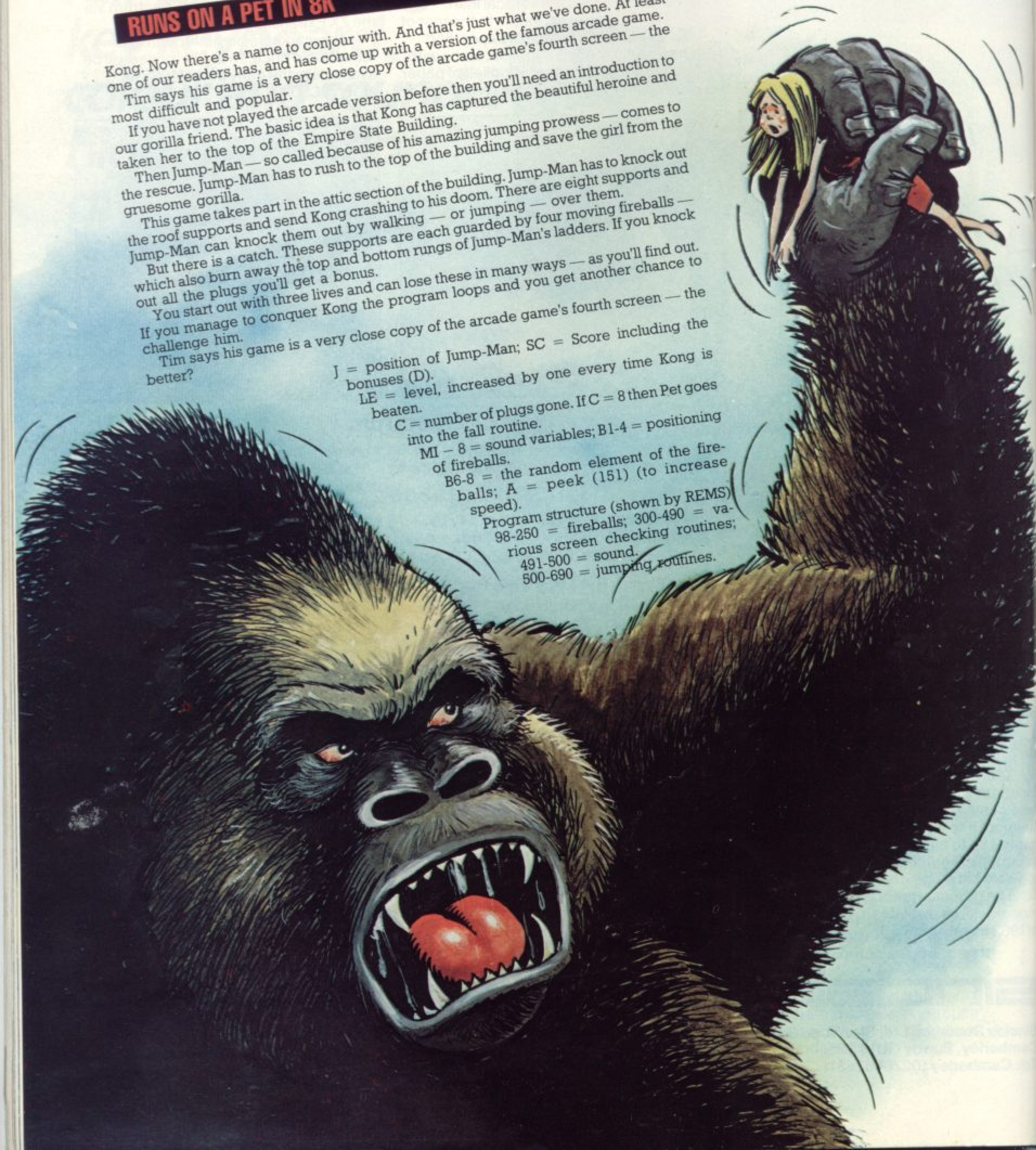
LE = level, increased by one every time Kong is beaten.

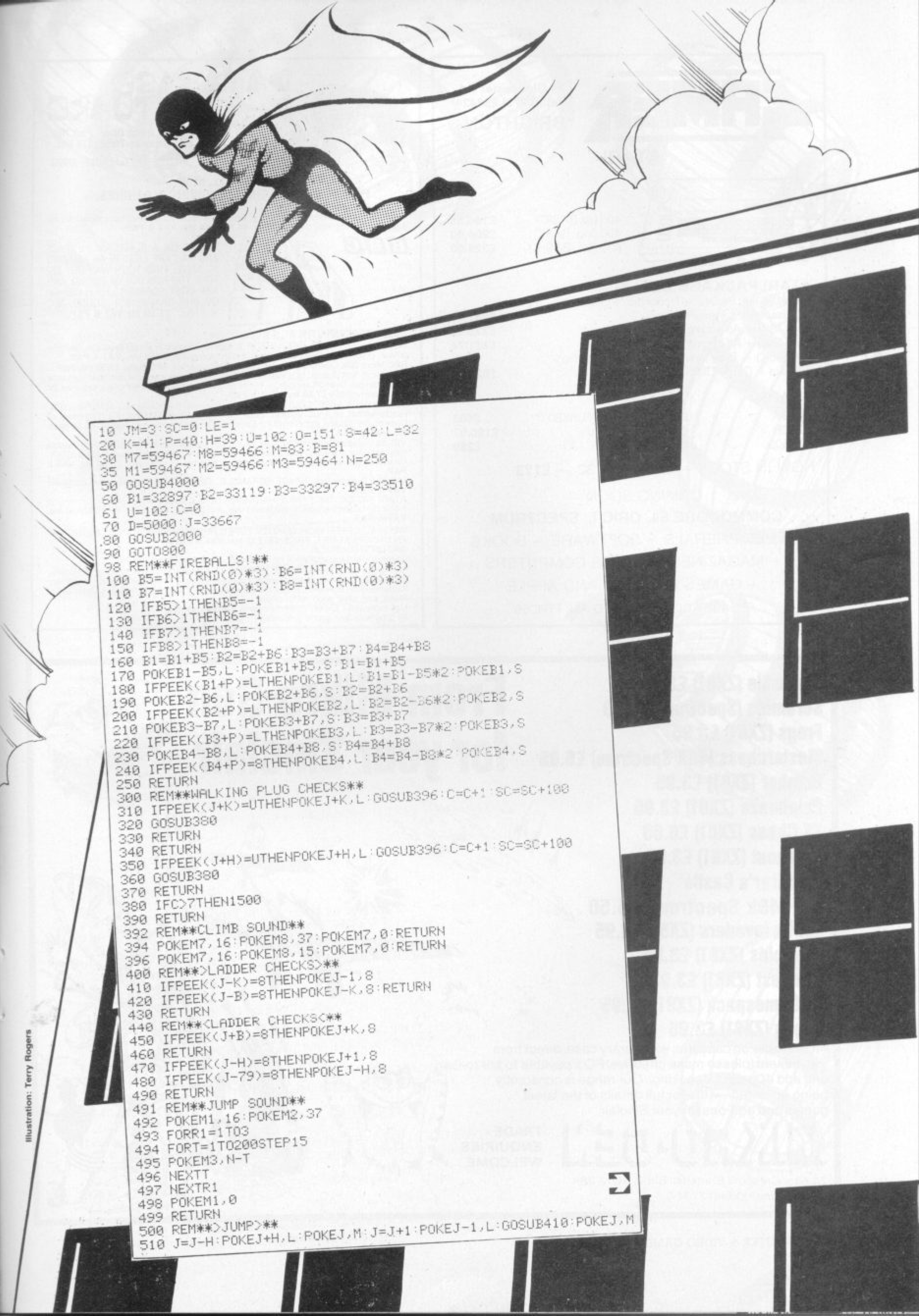
C = number of plugs gone. If C = 8 then Pet goes into the fall routine.

MI – 8 = sound variables; B1-4 = positioning of fireballs.

B6-8 = the random element of the fire-balls; A = peek (151) (to increase speed).

Program structure (shown by REMS) 98-250 = fireballs; 300-490 = various screen checking routines; 491-500 = sound. 500-690 = jumping routines.





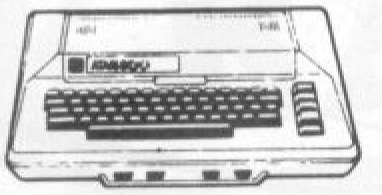
```
10 JM=3:SC=0:LE=1
20 K=41:P=40:H=39:U=102:O=151:S=42:L=32
30 M7=59467:M8=59466:M=83:B=81
35 M1=59467:M2=59466:M3=59464:N=250
50 GOSUB4000
60 B1=32897:B2=33119:B3=33297:B4=33510
61 U=102:C=0
70 D=5000:J=33667
80 GOSUB2000
90 GOTO800
98 REM**FIREBALLS!**
100 B5=INT(RND(0)*3):B6=INT(RND(0)*3)
110 B7=INT(RND(0)*3):B8=INT(RND(0)*3)
120 IFB5>1THENB5=-1
130 IFB6>1THENB6=-1
140 IFB7>1THENB7=-1
150 IFB8>1THENB8=-1
160 B1=B1+B5:B2=B2+B6:B3=B3+B7:B4=B4+B8
170 POKEB1-B5,L:POKEB1+B5,S:B1=B1+B5
180 IFPEEK(B1+P)=LTHENPOKEB1,L:B1=B1-B5*2:POKEB1,S
190 POKEB2-B6,L:POKEB2+B6,S:B2=B2+B6
200 IFPEEK(B2+P)=LTHENPOKEB2,L:B2=B2-B6*2:POKEB2,S
210 POKEB3-B7,L:POKEB3+B7,S:B3=B3+B7
220 IFPEEK(B3+P)=LTHENPOKEB3,L:B3=B3-B7*2:POKEB3,S
230 POKEB4-B8,L:POKEB4+B8,S:B4=B4+B8
240 IFPEEK(B4+P)=8THENPOKEB4,L:B4=B4-B8*2:POKEB4,S
250 RETURN
300 REM**WALKING PLUG CHECKS**
310 IFPEEK(J+K)=UTHENPOKEJ+K,L:GOSUB396:C=C+1:SC=SC+100
320 GOSUB380
330 RETURN
340 RETURN
350 IFPEEK(J+H)=UTHENPOKEJ+H,L:GOSUB396:C=C+1:SC=SC+100
360 GOSUB380
370 RETURN
380 IFC>7THEN1500
390 RETURN
392 REM**CLIMB SOUND**
394 POKEM7,16:POKEM8,37:POKEM7,0:RETURN
396 POKEM7,16:POKEM8,15:POKEM7,0:RETURN
400 REM**>LADDER CHECKS>**
410 IFPEEK(J-K)=8THENPOKEJ-1,8
420 IFPEEK(J-B)=8THENPOKEJ-K,8:RETURN
430 RETURN
440 REM**<LADDER CHECKS<**
450 IFPEEK(J+B)=8THENPOKEJ+K,8
460 RETURN
470 IFPEEK(J-H)=8THENPOKEJ+1,8
480 IFPEEK(J-79)=8THENPOKEJ-H,8
490 RETURN
491 REM**JUMP SOUND**
492 POKEM1,16:POKEM2,37
493 FORR1=1TO3
494 FORT=1TO200STEP15
495 POKEM3,N-T
496 NEXTT
497 NEXTR1
498 POKEM1,0
499 RETURN
500 REM**>JUMP>**:POKEJ+H,L:POKEJ,M:J=J+1:POKEJ-1,L:GOSUB410:POKEJ,M
510 J=J-H:POKEJ+H,L:POKEJ,M:J=J+1:POKEJ-1,L:GOSUB410:POKEJ,M
```

Illustration: Terry Rogers

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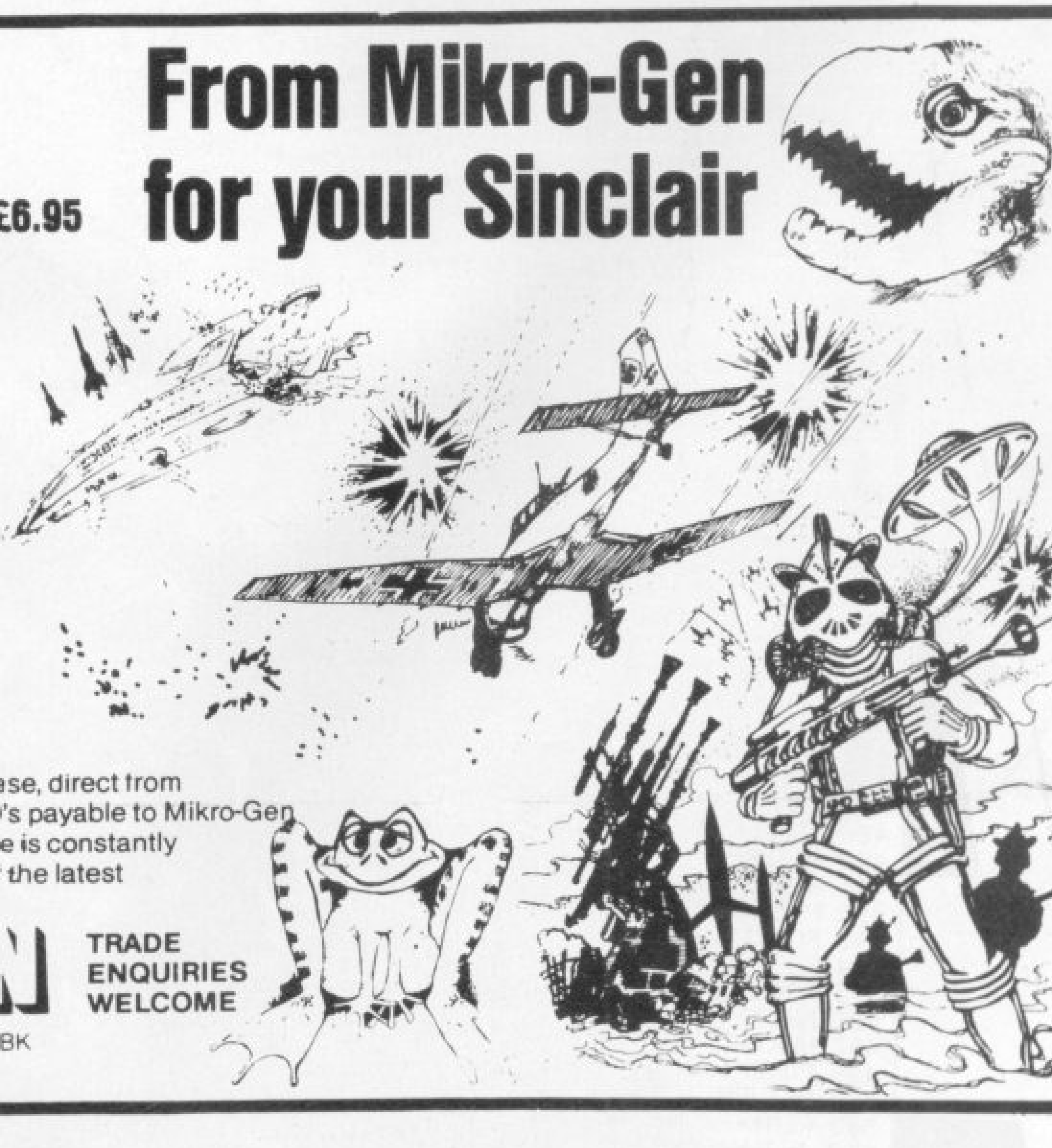
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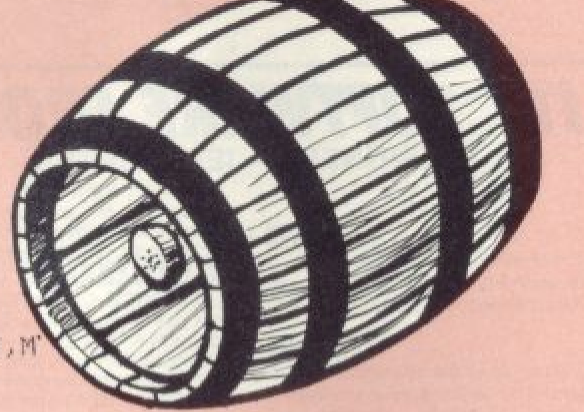
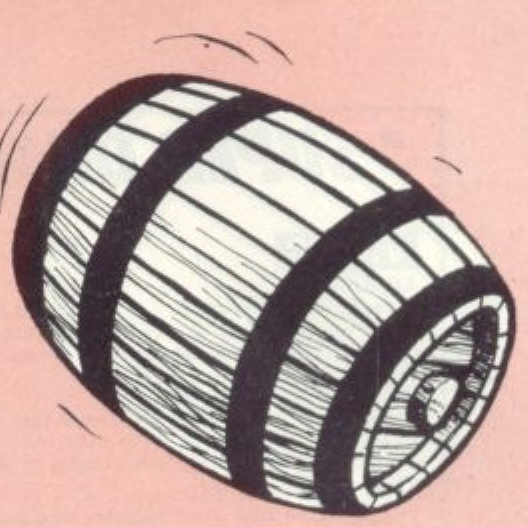


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MIKRO-GEN

TRADE ENQUIRIES WELCOME

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Tel: Bracknell (0344) 27317

```
520 J=J+K:POKEJ-K,L:GOSUB420:POKEJ,M
530 GOSUB492
540 REM**>JUMPING PLUG CHECKS>**
545 IFPEEK(J+P)=LTHENGOSUB1250
550 IFPEEK(J+36)=UTHENPOKEJ+36,L:C=C+1:SC=SC+100
560 IFPEEK(J+37)=UTHENPOKEJ+37,L:C=C+1:SC=SC+100
570 IFPEEK(J+38)=UTHENPOKEJ+38,L:C=C+1:SC=SC+100
580 IFPEEK(J+H)=UTHENPOKEJ+H,L:C=C+1:SC=SC+100
590 RETURN
600 REM**<JUMP<**
610 J=J-K:POKEJ+K,L:POKEJ,M:J=J-1:POKEJ+1,L:GOSUB470:POKEJ,M
620 J=J+H:POKEJ-H,L:GOSUB480:POKEJ,M
630 GOSUB492
640 REM**<JUMPING PLUG CHECKS<**
645 IFPEEK(J+P)=LTHENGOSUB1250
650 IFPEEK(J+44)=UTHENPOKEJ+44,L:C=C+1:SC=SC+100
660 IFPEEK(J+43)=UTHENPOKEJ+43,L:C=C+1:SC=SC+100
670 IFPEEK(J+42)=UTHENPOKEJ+42,L:C=C+1:SC=SC+100
680 IFPEEK(J+K)=UTHENPOKEJ+K,L:C=C+1:SC=SC+100
690 RETURN
800 REM***SCENERY***
810 PRINT"♫"
820 PRINT:PRINT
830 PRINT"        H    H                       H       H"
840 PRINT"        H───▒─H───────────────────────H─▒─────H"
850 FORX=1TO3:PRINT"       H       H              H         H":NEXTX
860 PRINT"    H H     H          H          H        H H"
870 PRINT"    H────────▒─────────H──────────────▒─────H"
880 FORX=1TO3:PRINT"    H                  H                  H":NEXTX
890 PRINT"  H H        H          H          H          H H"
900 PRINT"  H──────────▒H──────────────────────H─▒──────H"
910 FORX=1TO3:PRINT"   H            H                  H      H":NEXTX
920 PRINT"H H         H          H          H           H H"
930 PRINT"H────────────▒──────────H──────────────▒───────H"
940 FORX=1TO3:PRINT"H                   H                  H":NEXT
950 PRINT"────────────────────────────────────────────────"
990 POKEJ,M
992 PRINT"▓N"
995 Z$="♥"
996 FORQ=JMTO1STEP-1:PRINTZ$;:NEXTQ
1000 REM**MOVEMENT-MAIN PROG**
1010 A=PEEK(0)
1020 IFA=STHENJ=J-1:POKEJ+1,L:GOSUB310:POKEJ,M
1030 IFA=KTHENJ=J+1:POKEJ-1,L:GOSUB350:POKEJ,M
1040 REM**CLIMBING**
1050 IFA=50THENIFPEEK(J-P)=8THENJ=J-P:POKEJ+P,8:GOSUB394:POKEJ,M
1055 A1=PEEK(J+P)
1060 IFA=18ANDA1=8THENJ=J+P:POKEJ-P,8:GOSUB396:POKEJ,M
1070 REM**JUMP**
1080 IFA=12THENGOSUB500
1085 REM**PLUG CHECK**
1090 IFA=5THENGOSUB600
1100 REM**REPLACING LADDER (WALK)**
1110 IFPEEK(J-K)=8ORPEEK(J+H)=8THENPOKEJ-1,8
1120 IFPEEK(J-H)=8ORPEEK(J+K)=8THENPOKEJ+1,8
1130 REM**DEATH CHECK**
1140 IFA1=LTHENGOSUB1250
1150 REM**FIREBALLS MOVE**
1160 GOSUB100
1170 REM**BONUS & SCORE**
1180 D=D-10
1190 PRINT"▓BONUS:";D;"▌   SCORE:";SC;"▌   LEVEL:";LE;"▌   "
1200 IFD=0THENPOKEJ,0:GOSUB396:FORW=1TO3000:NEXT:GOTO1400
1210 REM**F/BALL KILL CHECK**
1220 IFPEEK(J+1)=SORPEEK(J-1)=SORPEEK(J)=STHENPOKEJ,0:GOSUB396:GOTO1300
1230 IFPEEK(J-P)=SORA1=LTHENPOKEJ,0:GOSUB396:GOTO1300
1240 GOTO1010
1250 REM**FALL AND DEATH THROUGH HOLE**
1260 FORV=1TO20
1270 J=J+P:POKEJ-P,L:POKEJ,M:IFPEEK(J+P)<>LTHENPOKEJ,0:GOSUB396
1300 IFPEEK(J)=0THENFORU=1TO3000:NEXT:GOTO1400
1310 NEXTV
1400 REM**MEN CHECK & APPROP ACTION**
1410 JM=JM-1
1415 IFJM>0THENGOTO60
1420 PRINT"▓▓▓▓▓▓▓▓▓▓▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶GAME OVER"
1430 PRINT"▓▓▓▓▓▓▓▓▓▓▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶ANOTHER GAME? (Y/N)"
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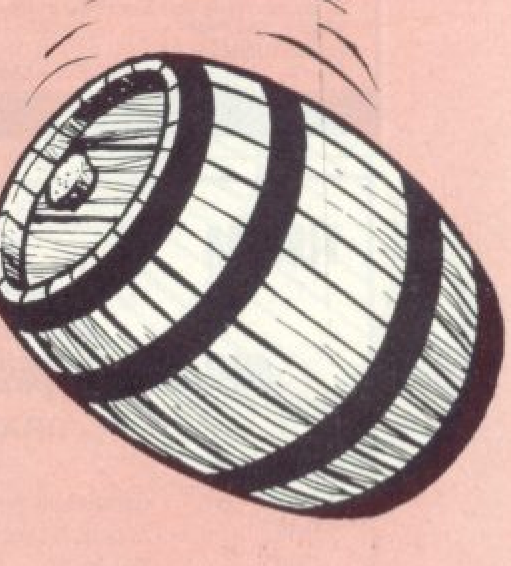





Illustration: Terry Rogers

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ANDES ATTACK (8K) NEW J

Your spacecraft must attack the descending aliens and frustrate their evil intent. Fly your Ramjet fighter over the Andes mountain range and protect your llamas from kidnap by hostile UFOS. Features 5 kinds of UFO, controls include up, down, reverse, fire, thrust and smart bomb. Entirely in machine code. Requires 8K expansion and joystick. **£8.00 + 50p P&P.**

TRAXX M/C (8K + EXPANSION) J

This is VIC 20 cross breed between the now famed 'Packman' and the game 'Quix'. All in machine code, fast and fun with joystick controls, uses Hi-Res colour graphics. 8K or larger expansion needed. **Only £6.00 + 50p P&P complete with instructions.**

BLITZKRIEG

As seen at the Commodore show and reviewed by the Daily Telegraph. Fly your Vulcan Bomber over the enemy city and destroy the buildings. 25 levels of play, uses Hi-Res colour graphics and plays Rule Britannia between waves. **Only £4.95 complete with instructions.**

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Rox is a challenging game involving the defence of your lunar base from a deadly meteor shower. Rox-64 includes amazing sprite graphics displays and spacy sound effects, and an awesome 'mothership' display if you win the game. Top 10 scores are tabled along with their names. This program shows just what can be achieved using only Commodore-64 basic. Study the listing and learn how to use sprites and sound on this outstanding machine. **£4.95 + 50p P&P.**

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ZX81

CENTIPEDE (16K)

the ORIGINAL game from the ORIGINAL author. This is the identical program to that being sold by other companies for three times our price. The game has received ecstatic reviews in the computing press. Program has 30 speed levels and ever increasing Centipede hordes. Tables top 10 scores and names. Why wait to pay more? **Only £1.95 + 50p P&P.**

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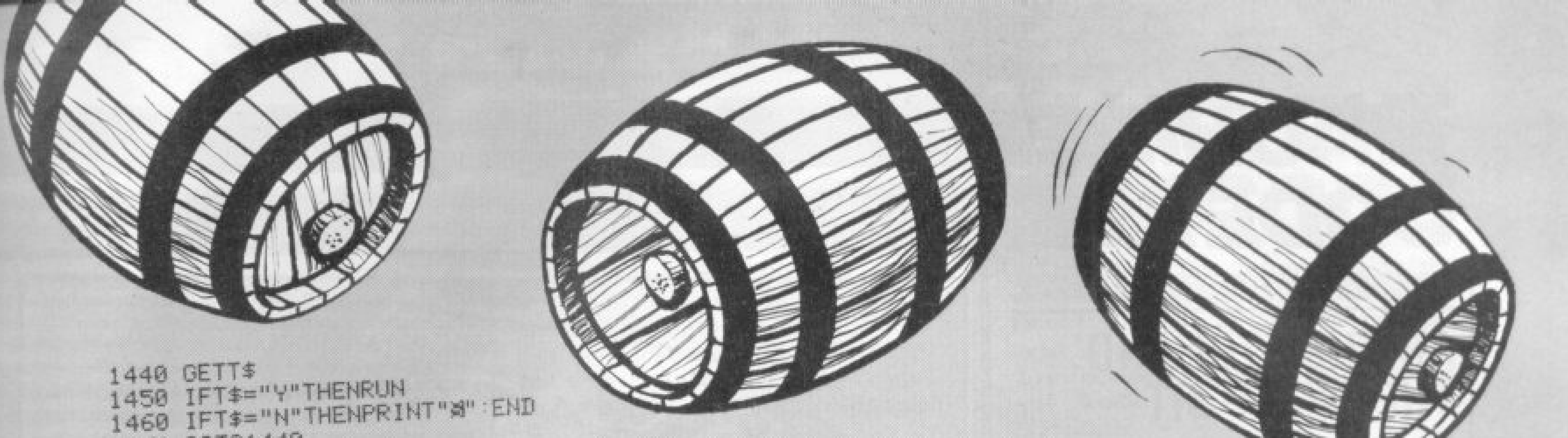
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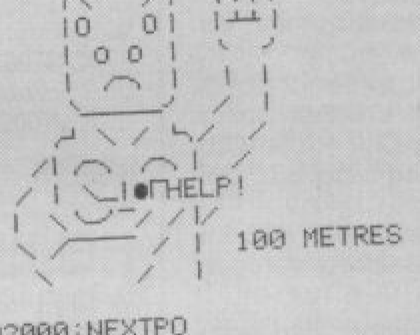
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```
1440 GETT$
1450 IFT$="Y"THENRUN
1460 IFT$="N"THENPRINT"♥":END
1461 GOTO1440
1470 SC=SC+D:GOTO60
1500 REM**RAFTERS FALL!**
1510 PRINT"♥":FORF=1TO23                              ":NEXTF
1520 PRINT"▶▶▶▶▶▶▶▶▶▶▶
1530 PRINT"♥▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼"
1540 FORG=1TO4
1550 PRINT"▶▶▶▶▶▶▶▶▶▶▶ ─────────────────────"
1560 NEXTG
1570 PRINT"                ╭──╮ ╭─────╮-KONG(RIP)"
1580 REM**CRASH SOUND**
1590 POKEM1,16:FORB=1TO255:POKEM2,B:NEXTB:POKEM3,0
1600 PRINT"♥▼▼▼▼▼▼▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶YOU WIN!!"
1610 GOSUB1700
1620 PRINT"♥▼▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶YOU HAVE"
1622 GOSUB1700
1623 R$="♥▼▶▶▶▶▶▶▶▶▶▶▶▶▶▶"
1625 PRINTR$;"CONQUERED KONG."
1630 GOSUB1700
1640 PRINTR$;"ISN'T TRUE LOVE"
1642 GOSUB1700
1644 PRINTR$;"WONDERFUL?"
1646 GOSUB1700:PRINT"♥▼▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶NOW TRY AGAIN..."
1655 SC=SC+D:LE=LE+1
1660 FORW=1TO5000:NEXT
1670 GOTO60
1700 FORW=1TO2000:NEXT
1710 RETURN
2000 REM**KONG PICTURE**
2020 PRINT"♥"
2060 PRINT"♥▼▶▶▶▶▶▶▶▶▶▶▶HOW HIGH CAN YOU TRY?"
2066 PRINT"♥▼▼▼▼▼▼"
2070 FORY=1TOSR
2090 PRINT"
2100 PRINT"
2110 PRINT"
2120 PRINT"
2125 PRINT"
2130 PRINT"
2140 PRINT"
2150 PRINT"
2160 PRINT"
2170 PRINT"
2180 PRINT"
2190 PRINT"
```




```
2220 NEXTY
2222 FORPO=1TO2000:NEXTPO
2230 RETURN
4000 PRINT"♥▼▶▶▶▶▶▶▶▶▶▶▶▶▶▶KRAZY KONG"
4010 PRINT"▼      BY TIM BOONE,SOUTHAMPTON"
4020 PRINT"▼▼ THE BASIC IDEA: YOU ARE ON THE FOURTH"
4030 PRINT"▼SCREEN OF THE ARCADE GAME.THAT IS,YOU"
4040 PRINT"▼ARE IN THE ATTIC.KNOCK OUT THE PLUGS"
4050 PRINT"▼BY WALKING OR JUMPING OVER THEM."
4060 PRINT"▼WHEN YOU HAVE KNOCKED OUT ALL THE PLUGS"
4070 PRINT"▼WATCH WHAT HAPPENS!"
4080 PRINT"▼ P.S. MAKE SURE THE FIREBALLS DON'T COME"
4090 PRINT"▼TOO CLOSE!"                              "
4100 PRINT"▼▼                 PRESS <SPACE>
4110 GETT$:IFT$=""THEN4110
4120 PRINT"♥▼▼               KEYBOARD COMMANDS:"
4130 PRINT"▼                    8=UP"
4140 PRINT"▼                    2=DOWN"
4150 PRINT"▼                    4=LEFT"
4160 PRINT"▼                    6=RIGHT"
4170 PRINT"▼                    <=JUMP LEFT"
4180 PRINT"▼                    >=JUMP RIGHT"
4190 PRINT"▼▼  YOU SCORE 100 FOR EACH PLUG REMOVED"
4200 PRINT"▼ AND WIN THE BONUS IF YOU CONQUER KONG."
4210 PRINT"▼▼▼    PRESS <SPACE> TO PLAY...           "
4220 GETT$:IFT$=""THEN4220
4230 RETURN
```

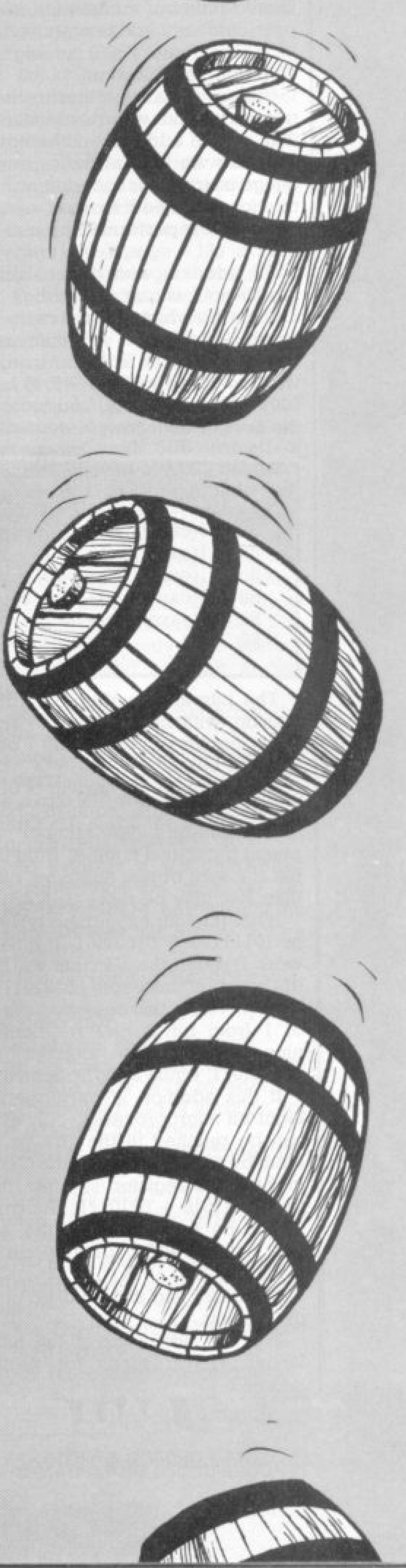


Illustration: Terry Rogers

MACHINE CODE

ARITHMETIC AND THE EIGHT-BIT . . .

Eight-bit microprocessors have a very limited range of arithmetic instructions, providing only addition and subtraction — and, in the 6809, an eight-bit by eight-bit multiplication.

Unless you are writing mathematical programs you will rarely need more than simple addition and subtraction.

Before we look at the assembly language instructions for addition and subtraction we need to look at the way arithmetic is performed on binary numbers.

An addition with decimal numbers, say 26 + 47, is carried out digit by digit: 6 + 7 = 13, which is 3 and carry 1; 1 (the carry) + 2 + 4 = 7, so the answer is 73.

We do binary addition in the same way, so the sum 26 + 47 in binary is 00011010 + 00101111, and we calculate the answer as follows:

Bit 0:	0+1=1
Bit 1:	1+1=0, carry 1
Bit 2:	1(carry) +0+1=0, carry 1
Bit 3:	1(carry) +1+1=1, carry 1
Bit 4:	1(carry) +1+0=0, carry 1
Bit 5:	1(carry) +0+1=0, carry 1
Bit 6:	1(carry) +0+0=1
Bit 7:	0+0=0

The bits are numbered in the usual fashion, with bit 0 being the rightmost (least significant) bit and bit 7 being the leftmost bit).

Thus we find the answer is 01001001, which is, of course, equal to 73 decimal.

An eight-bit binary number can represent a decimal number from 0 to 255, but the sum of two numbers, each less than 255, may be more than 255.

If we take an example, say 190 + 77, or 10111110 + 01001101 in binary, and work through the addition we find that the eight-bit answer is 00001011.

However, in this case we have a carry of 1 from bit 7, and we really need nine-bits for the correct answer 100001011, equal to 267 decimal.

If this addition is performed on an eight-bit microprocessor only eight-bits can be retained in the answer but the ninth bit will be stored in the Carry Flag in the Flags register, so after the addition 00011010 + 00101111 the carry flag would be 0, while after the addition 10111110 + 01001101 the carry flag would be 1.

The carry flag can be used in further processing.

We can now look at the assembly language instructions for performing addition.



FLYING THE FLAG WITH THE 6502

The opcode mnemonic for the addition instruction on the 6502 is ADC (ADd with Carry), which adds an eight-bit operand, the contents of the accumulator, and the carry flag, leaving the eight-bit result in the accumulator and the carry in the carry flag.

The carry flag is always included in an addition, and we have two instructions to alter the carry flag; CLC (Clear Carry) makes the carry flag 0 and SEC (SEt Carry) makes the carry flag 1.

To perform the eight-bit addition from the first example above we could write:

LDA #26; Get first number into accumulator
CLC; Make carry flag zero
ADC #47; Add second number to A, leaving result in A

We can use other addressing modes with the ADC instruction, including absolute addressing which we looked at last month, and other addressing modes we have not covered yet.

The registers in the 6502 hold eight-bits only and to add numbers larger than 255 (more than eight-bits), we have to break the addition down into eight-bit sections.

For an example of a 16-bit addition, using absolute addressing, suppose we have two 16 bit numbers, the first in memory locations 1000 & 1001 hex, the second in memory locations 1002 & 1003 hex, and we want the answer in memory locations 1004 & 1005 hex (the numbers would be stored with the low eight-bits in the first of the two memory locations).

To get the 16-bit answer we first add the low eight-bits of the two numbers and then add the high eight-bits and the carry from the low eight-bits:

LDA $1000; Low byte of 1st number into accumulator
CLC; Make carry flag 0
ADC $1002; Add low byte of 2nd number
STA $1004; Store low byte of answer
LDA $1001; High byte of 2nd number into accumulator
ADC $1003; Add carry and high byte of 2nd number
STA $1005; Store high byte of answer.

HELPING THE 6809 ADD THINGS UP

For eight-bit addition we have the opcode mnemonics ADDA and ADCA which use accumulator A, and ADDB and ADCB which use accumulator B. ADDA and ADDB add the eight-bit number specified in the operand to the appropriate accumulator, leaving the answer in that accumulator.

ADCA and ADCB add the operand, accumulator and carry flag, leaving the result in the accumulator. All these instructions leave the carry from the addition in the carry flag.

To perform the addition in the first example above we can write:

LDA #26; Get first number into accumulator
ADDA #47; Add second number, leaving answer in A.

As in the 6502 we can use other addressing modes with these addition instructions.

BY TED BALL

We also have the opcode mnemonic ADDD for 16 bit addition; this operates on the accumulator D which you will remember from last month is really another name for the two eight-bit accumulators A and B together.

Thus, to add two 16-bit numbers, the first stored in memory locations 1000 and 1001 hex, the second stored in memory locations 1002 and 1003 hex, with the answer being stored in memory locations 1004 and 1005 hex (the numbers being stored with the high byte first), we would write:

LDD $1000; Get first number into D
ADDD $1002; Add 2nd number, leaving answer in D
STD $1004; Store answer in memory.

There is no add with carry instruction for accumulator D.

Addition of numbers with more than 16-bits can be performed by breaking down the numbers into eight or 16-bit sections and adding a section at a time, using an ADD instruction for the low eight or 16-bits and an ADC instruction for subsequent eight-bit sections.

ADDRESSING YOUR Z80 CORRECTLY

For eight-bit additions we have the opcode mnemonics ADD and ADC, each of which can be used in three addressing modes.

The ADD instructions add the operand to the accumulator A, leaving the result in A, and the ADC instructions add the carry flag and the operand to the accumulator, leaving the result in the accumulator.

The instructions are ADD A, data; ADC A, data; ADD A, reg; ADC A, reg; ADD A, (HL); ADC A, (HL).

In the first pair the operand is included in the instruction; in the second pair the operand is the contents of one of the registers A,B,C,D,E,H,L; and in the third pair the operand is the contents of the memory location whose address is in the register pair HL.

The addition from our first example above can be performed in several ways:

LD A,26; Get first number into accumulator
ADD A,47; Add second number, leaving answer in A
or
LD A,26; Get first number into A
LD B,47; Get second number into B
ADD A,B; Add B to A leaving answer in A etc.

We also have the 16-bit addition instructions ADD HL,BC; ADC HL,BC; ADD HL,DE; ADC HL,DE; ADD HL,HL; ADC HL,HL, which add, or add with carry, a register pair to the register pair HL, leaving the answer in HL.

To add two 16-bit numbers, the first stored in memory locations 1000 hex and 1001 hex, and the second stored in memory locations 1002 hex and 1003 hex, with the answer going into memory locations 1004 and 1005 hex (the numbers being stored with the low byte first), we can write:

LD HL,(1000H); First number into HL
LD BC,(1002H); Second number into BC
ADD HL,BC; Add BC to HL leaving answer in HL
LD (1004H),HL; Store answer in memory.

To add numbers of more than 16 bits we must break up the addition into eight or 16-bit sections and perform the addition one section at a time, using an ADD instruction for the low eight or 16-bits and an ADC instruction for subsequent eight or 16-bit sections.

PAY YOUR MICRO A COMPLEMENT . . .

So far we have regarded all binary numbers as being positive, eight-bit numbers representing a decimal number from 0 to 255 and 16-bit numbers representing a decimal number from 0 to 65535.

There are several ways of representing negative numbers in binary, but the commonest, and the most useful with microprocessors is *twos complement notation.*

To get the twos complement of a binary number we change the 0s to 1s and the 1s to 0s and add 1 to the result.

For example, to find the twos complement of 10110111 we first change 0s to 1s and 1s to 0s, giving 01001000, then add 1, giving 01001001.

If we add an eight-bit number to its twos complement we always find that the answer is 00000000, with a carry of 1, so the twos complement can be regarded as the negative of the number. Thus we have:

−1=twos complement of 00000001=11111111
−2=twos complement of 00000010=11111110

The easiest way of performing a binary subtraction by hand is to add the twos complement, so, for example 1−2 becomes 1 + (−2), or 00000001 + 11111110 which gives an eight-bit answer of 11111111. This is the number we get when we work out the twos complement form of −1.

In twos complement notation an eight-bit binary number represents a number between −128 decimal (10000000 binary) and +127 decimal (01111111 binary). Note that in the twos complement notation the high order bit of a negative number is 1 and the high order of a positive number is 0.

The subtraction instructions in the eight-bit microprocessors treat binary numbers as having the twos complement form, so, for example 10 −5 would give the binary result 00000101 and 5 −10 would give the binary result 11111011.

In the addition of binary numbers we that when the binary numbers were regarded as representing positive numbers in the range 0 to 255 the result of an addition could be more than 255, in which case the answer was a number less than 255 but the carry flag was set to 1 by the addition.

We have a similar situation with addition and subtraction of twos complement binary numbers.

If the result of the decimal calculation with numbers in the range −128 to +127 comes outside that range the eight-bit answer produced by the processor must of course be treated as a number between −128 and +127, but the **Overflow Flag** (called V in the 6502 and 6809, and O or P/O in the Z80) is set to 1.

The assembly language instructions for subtraction are similar to the addition instructions, with SUB instead of ADD and SBC instead of ADC, but there are differences between the three processors in the way the carry is handled in the SBC instructions.

The 6809 and Z80 have eight and 16-bit SUB and SBC instructions which can be used in exactly the same way as the ADD and ADC instructions. The 6502, however, has only SBC instructions, and we need to look at this separately.

The SBC instruction performs the calculation

Accumulator — operand — complement of carry

so if the carry is 0 we get accumulator — operand −1, and if the carry is 1 we get accumulator — operand −0.

Thus, to perform a straightforward eight-bit subtraction we must set the carry flag to 1 before performing the subtraction. To subtract 5 from 10 we need to write:

LDA 10; Get 1st number into accumulator
SEC; Set carry to 1
SBC 5; Get answer in accumulator.

We can perform 16-bit (or more) subtraction in a similar way to addition. With subtraction instead of addition our previous example becomes:

LDA $1000; Low byte of 1st number into accumulator
SEC; Make carry flag 1
SBC $1002; Subtract low byte of 2nd number
STA $1004; Store low byte of answer
LDA $1001; High byte of 1st number into accumulator
SBC $1003; Subtract high byte of 2nd number and carry
STA $1005; Store high byte of answer.



BETWEEN THE LINES . . .

The effect of hidden line removal is shown in the two accompanying illustrations of rockets. One has hidden lines removed and one does not. I hope you will agree that the drawing of the rocket with the hidden lines removed (Fig 2) appears much more solid and realistic than the other.

The methods used for removing hidden lines are quite complex and highly mathematical, but for certain special cases they can be made comparatively simple.

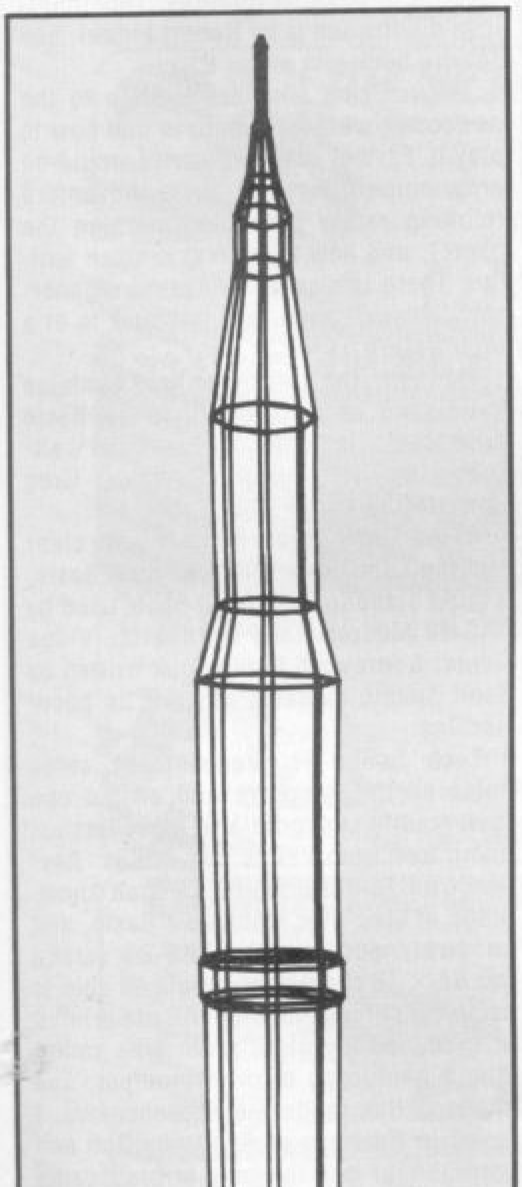


Fig 1.

A technique that helps in producing realistic images of solid objects is the removal of hidden lines from drawings of the object.

When describing a solid object, all the lines that are needed to represent its edges must be given because it may be necessary to view it from any angle.

A view of it from a specific viewpoint can be generated by using the perspective transformation. However, if the transformation is applied indiscriminately to all the lines of the object, what will be seen is a *wire-frame* representation of the object with the lines that ought to be obscured from view because they are at the back of the object displayed just as prominently as those at the front which actually are visible.

Although the *wire-frame* type of image does give a good idea of the shape of the object, it does not always convey the impression of solidarity that one might want to achieve. Besides this, it sometimes gives images that are ambiguous in the sense that they make visual sense in more than one way.

These problems can all be overcome if the lines that would be hidden from the viewer are removed.

The first point to make is that what conceals the part of an object that is hidden from view is a surface in front of it. The surface itself is surrounded by edges, all of which will be lines.

So the way to find out which are hidden from view is to determine which surfaces are masked from the observer by others, and then not to draw the lines representing the edges of hidden surfaces.

For this reason, a solid object needs to be described not simply in terms of the lines that give its edges, but also in terms of its surface facets. The lines outlining each surface facet must however be given.

To give an example, when dealing with a cube all its six surfaces would need to be given (those at the front, back, left, right, top and bottom). Each would be described by the four lines that surround the square surface facets.

One fairly simple way to remove the hidden lines is to draw each surface as a filled-in area starting from the back (that is, with the

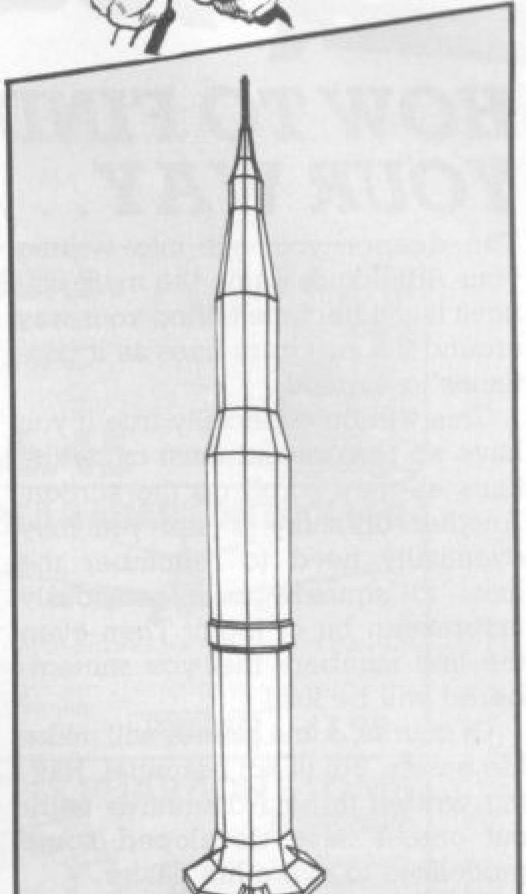


Fig 2.

surfaces furthest from the observer), and working forwards.

In this way plotting the nearer surfaces will automatically cause them to overlay the ones that are further away, thus removing the parts that ought to be obscured.

A second method starts by plotting the points on the object nearest to the observer. It proceeds by examining the points that are further away, but along each line of sight from the observer to the object a region of visibility is maintained by continually updating the upper and lower horizons between which visibility is blocked by the parts already drawn.

Naturally the points that are found to be masked from view are not drawn, thereby removing the hidden parts. Only lines outside the marked region are drawn.

The only place that I have seen a comparitively simple program based on the last method and written in Basic is in *Practical programs for the BBC Computer and Acorn Atom* by David Johnson-Davies (Sigma Technical Press, 1982).

This gives a program for drawing surfaces with hidden line removal. For purposes of comparison, a program for drawing the surface without removing the hidden parts is also given there.

BY GARRY MARSHALL

Adventure

HOW TO FIND YOUR WAY . . .

BLOCK	LINE RANGE	PURPOSE
1	100/150	CLEAR string space DEFINE variable types DIMENSION arrays
2	200-250	READ DATA Assign variables
3	300-450	Check special conditions Clear screen PRINT display Await INPUT
4	500-600	Interpret INPUT
5	1000-30000	Execute plot (Verb routines)
6	40000 +	Set standard replies
7	50000 +	DATA statements

Figure 1. Line number range of each coding block

The deeper you get into writing your Adventure game the more difficult it will become to find your way around the program lines as it continues to expand.

This will be especially true if you have no printer and must catch the lines as they scroll up the screen. Another difficulty is that you may eventually need to renumber the lines to squeeze in a previously unforeseen bit of logic. Then even the line numbers that you remembered will be lost!

Of course, a line printer will make life easier, but is not essential. Having written three Adventures without one, I have developed some guidelines to make life easier.

The first rule is to number lines in increments of no less than 10. This will leave plenty of gaps for insertions, reducing the likelihood of having to renumber.

Line numbers must be planned in advance, and the whole program sprinkled liberally with remarks. Back in the May issue I summarised how blocks of code might be laid out, and figure 1 shows a suggested range of line numbers for each block.

You can see that the bulk of the program is contained in Block 5 where the routines for each verb reside. Let us look in more detail at this block, as it contains the least distinguishable code in the program.

Start the routine for each verb on an increment of 1000, and then in 10's for each verb. Since each verb routine will be accessed by an ON K1 GOTO statement (K1 being the decode number for the verb) it is useful to precede each of these with a REM.

But wait! One of your last tasks on completion of the program will be to remove the REMs for three reasons; to save memory, speed execution, and to remove clues for would-be cheats! If the REMs are written on the lines pointed to by the ON K1 GOTO line numbers, undefined line errors will be the order of the day when they're deleted.

So place them on the line immediately preceding the start of each routine. Thus REMs for Block 5 would appear on lines 999, 1999, 2999 etc.

When they're gone, the running of the program will not be affected. As a bonus, deleting them will be easier, since they will be recognised as having numbers ending with a 9.

Figure 2 shows some typical code using REMs. Note that they are surrounded by asterisks — much easier to spot when scrolling!

```
 599 REM ******** GOTO DECODED VERB ROUTINES *********
 600 ON K1 GOTO 1000, 2000, 3000 . . . ETC

 999 REM ********* TAKE *************
1000 IF IN > 6 THEN Q1$= "I'M CARRYING TOO MUCH" : GOTO 100
1010 IF P(K2) = 50 THEN Q1$ = "ALREADY GOT IT!" : GOTO 100
1020 IF P(K2) <> LN THEN Q1$ = "DON'T SEE IT HERE" : GOTO 100
1030 IF C(K2) <2 THEN Q1$= "I CAN'T —YET" : GOTO 100
1040 P(K2)=50 : IN = IN + 1 ; Q1$= "OK" ; GOTO 100
1999 REM ********* DROP *************
2000 IF P(K2) <> 50 THEN Q1$="NOT CARRYING IT" ; GOTO 100
        etc, etc. . . .
```

Figure 2. Typical code showing numbering of REMs

As a change from software, I bring you the lowdown on a book — *The Captain 80 Book of Basic Adventures.* This American publication is by Robert Liddel, and set me back just under £12.

The opening chapters explain to the newcomer what Adventure is and how to play it. Further chapters advise would-be programmers how to write Adventure (plotting rather than programming the game), and how to market it when written. There is also an "Adventure generator" which I hope to come back to at a later date.

However, the bulk of the book contains the listing of no fewer than 18 Basic Adventures, including the works of well-known authors like Scott Adams, Greg Hassett and Lance Micklus.

At this point I must make it quite clear that the listings are all in Level II Basic, a fairly standard Microsoft Basic used by TRS-80 Models I and III, and the Video Genie. A foreward to the book written by Scott Adams explains most of its peculiarities.

Each listing is preceded by some notes on the program, and all but one look readily convertible to other Basics, being free from PEEKs and POKEs. Anyone with 16k of memory, a good knowledge of their own machine's Basic, and an awareness that the TRS-80 screen has 64 × 16 characters should be able to use most of these listings. All are printed in exceptionally clear plain type rather than a photocopy of printer output, and although this made me apprehensive, I keyed in *Revenge of Balrog* by Don and Freda Boner and the only errors I came across were self-inflicted!

I can recommend it to serious Adventurers — but if you don't have a TRS-80 compatible machine, do browse it before purchasing.

It is published by 80 Northwest Publishing Inc., USA. I bought my copy from Gamer of Brighton, but imagine that other dealers could obtain a copy.

BY KEITH CAMPBELL

VIDEOSCREEN

DANGEROUS MISSION ON PLANET X

PLANET PATROL

Spectravision's Planet Patrol is an all action scrolling space game for the Atari VCS.

Imaginative graphics and considerable playability are sure to make this game tough competition for Atari's own Defender.

The idea of the game is to rescue a pilot whose ship is drifting helplessly in space.

But at the same time your planet is being attacked by the TIAs (troublesome invading aliens) which you have to shoot down to score points.

When you have shot down the first wave of enemy ships and dodged their missiles you will be able to attack the enemy bases. But be careful to dodge the debris from the exploding missile bases as you will need to get past this to land at the space station in order to refuel for the night patrol. As you fly on the sky gets gradually darker and finally black.

The game now gets really tough as the screen is only lit by the moon and the occasional explosion of alien craft as your lasers blast deep into the night.

Also new from the SpectraVision stable this month is a pretty and compulsive grub gobbling game called Tapeworm.

You guide an ever lengthening snake around the screen eating up the pieces of food that flash up as you go.

It gets ever more difficult to control the snake and you can eat your own tail if you are not careful. Just to make things a little more difficult there are also two villains to be dealt with.

Nexar is a deep space 3D shoot out. Though not quite in the Activision Starmaster class it is none the less impressive.

Made in Hong Kong and imported from America there are six games in all in the brand new SpectraVision range.

The other titles are Gangster Alley — a sort of shooting arcade where the heads of various villains pop up for you to shoot at, Cross Force — another space game, and China Syndrome a tough race against time to stop a nuclear reactor exploding, based on the recent movie of the same name.

The games are available in this country in compatible PAL form from Pancom of Grimsby at £24.95.



Illustrations: Jon Davis and Terry Rogers

LET'S CLUB TOGETHER

GAMES CLUB

If you are fed up of forking out high prices for the latest video game cartridge then this is your chance to win the entire range of Atari compatible games.

The offer comes from the Video Games Club — a new mail order firm which offers a money-back guarantee to club members if they find they can purchase cartridges cheaper elsewhere.

To enter the competition you have to join the club. This costs £25 for life or £7.50 for one years trial membership.

New members will also receive two free puzzles worth over £8.

The first 1,000 members will then have their membership numbers fed into a computer and the lucky winner will be randomly selected.

WELCOME TO THE THIRD GENERATION

COLECOVISION

If you got an Atari VCS or Mattel Intellivision games machine for Christmas you may well be kicking yourself, or your dad, when you hear about the exciting new ColecoVision video games system.

The ColecoVision is one of the "Third Generation" of video games machines.

The video games boom was sparked off by the early bat and ball type games which were often given away free with new TV sets.

The next big breakthrough came with programmable video games such as the Atari VCS on which you could play an infinite number of games by simply purchasing a plug-in cartridge of your choice.

The so-called "Third Generation" machines — of which the ColecoVision is the first, are an upgrading and refinement of the second generation machines.

The ColecoVision has a massive 32K of Rom and 17K of Ram nestling under its black exterior. This makes it several times more powerful than all the video games machines currently on sale and also more powerful than most of the popular microcomputers as well.

Converted to gamers language this means superb detail, more moving characters than were previously possible, and greatly enhanced sound and colour.

The new machine will go on sale in the UK in the late Spring and early Summer with an impressive range of well known arcade titles. Prominent among these are Zaxxon, Donkey Kong, Gorf and Turbo.

Donkey Kong is practically identical to the Nintendo original and only the three hours play for twenty-pence merchants will be able to notice any difference . . .

Zaxxon is 90% as good as the arcade game which, for a "state of the art" 3D game is pretty good. Gorf too is very close to its arcade counterpart.

The fourth big game from the arcades to go with the new machine is the driving game Turbo. This requires a plug-in dashboard with steering wheel and a foot pedal accelerator which connects to it. The gears are changed with one of the hand controllers which also attatches to the dash.

Taking big names straight from the arcades will be deliberate policy to support the ColecoVision when the machine goes on sale. Through its parent company CBS and Ideal Toys, ColecoVision has first option on buying arcade games from some of the big American and Japanese arcade game designers.

Perhaps the most important of these add-ons is a converter which enables all existing games for the Atari VCS to be played on the new system.

The next important add on will be a computer keyboard which will turn the ColecoVision into a home computer — a pretty powerful one too as it will access 32K of Ram for user programs.

TOP SELLERS

Mattel Intellivision and Atari VCS games again dominate our top 10 video games best sellers for the month of November.

Intellivision titles come in first, third, seventh, ninth and 10th places. Dungeons and Dragons holds onto its first place spot as pre-Christmas best seller.

1 *Dungeons and Dragons* (Mattel); 2 *Defender* (Atari); 3 *B17 Bomber* (Mattel); 4 *Pacman* (Atari); 5 *Empire Strikes Back* (Parker Brothers); 6 *Star Raiders* (Atari); 7 *Lock 'n' Chase* (Mattel); 8 *Frogger* (Parker Brothers); 9 *Night Stalker* (Mattel); 10 *Sub Hunt* (Mattel).



VIDEO SCREEN

SUPERHERO MEETS THE SUPERBADDIE!

SPIDERMAN

Parker Video games will soon be providing some excitement at your local video games shop with personal appearances from Spiderman and Star Wars villain Darth Vadar to promote their new games for the Atari VCS.

They will also be launching the Parker Video Games Club with offers of high score T-shirts, posters and cartridge holders, plus the latest information on new releases and when and where the super-heroes will be appearing in person.

There will be plenty to think about on the new games front too with Amidar and Spiderman rocketing towards the *C&VG* top-ten Atari VCS chart.

Spiderman is challenged to a life or death race. He has to climb a sky-scraper and stop the Green Goblin exploding his super-bomb and devastating the city.

Spiderman climbs the building by shooting out his web and then winching himself up. You control the action using the joystick.

Pull the joystick down and Spiderman's web stretches enabling him to swing and kick down Green Goblin's henchmen who appear at the windows. You must be careful not to let the web swing across one of the Goblin's men. They will cut it — sending our hero crashing down to the ground.

The key to success in Spiderman is to use the web accurately and sparingly. You only have a certain amount of web strength which is displayed on the screen and which can also be supplemented by defusing the Goblin's bombs.

Also new from Parker Brothers this month is a version of the arcade game Amidar. This is a crazy-race to paint in the screen with blue boxes.

You are randomly an ape and a paint roller and are pursued by pigs and tribesmen. Quick reactions and a systematic approach are the keys to success in Amidar.



Parker Brothers have fifteen new Atari games planned for 1983, with Intellivision and Phillips versions promised for next July.

Next out will be a second Star Wars title called Jedi Arena and another game straight from the arcades. Super Cobra, the all action helicopter shoot-out, needs no introduction to Arcadesters.

Parker Video games are available from most good Atari stockists at £29.95.

ANYONE LOST AN ARK?

RAIDERS

Ever wished you were Indiana Jones, the swashbuckling hero of Raiders of the Lost Ark? Then this is your chance to share some of the action as you join the search for the fabled Lost Ark of the Covenant.

In this new game for the Atari VCS you must find the Ark which is hidden in the Valley of Poison, located somewhere outside the Egyptian city of Cairo.

The game follows the adventure format. You move Indy around the screen searching for clues, collecting treasure, and articles such as a whip, a pistol, and flute, which you will need to overcome specific challenges during the game.

The first scene puts you down in a market place where you have to collect the equipment you will need for your journey.

The first thing to buy is a flute which protects you from the snakes, spiders, and tetse-flies that pursue you later in the game.

You will also need a grenade to break your way into one of the rooms where more clues are hidden.

The whip and the pistol enable you to kill some of the adversaries you encounter and also let you blast the walls of the dungeons should you unfortunately find your self incarcerated during the game.

You are only allowed six pieces of equipment at a time. These are all shown at the bottom of the screen and you select the one you want to use by moving the indicator dot to below the appropriate piece.

As with most adventure games you have to explore a number of rooms containing various challenges. In Raiders they are based on the film.

Once you have found your way into the enormous mesa-field you can begin the search for the Valley of Poison wherein you will find the ark.

The game is played with both joysticks. The right joystick moves Indy around the screen, cracks his whip, fires his pistol, and explodes his grenade.

The left joystick moves the indicator dot enabling you to select items of equipment.

The game will be in the shops this month retailing at £29.95.

MORE DREAMS FROM THE AMERICANS

INTELLIVISION

Intellivision owners, jealous of the wider choice of games available for the Atari VCS, will have plenty to smile about in 1983.

The big three independent American games makers have now launched cartridges for the Mattel machine.

Prize-winning Demon Attack which was the top selling videogame in America in 1982 is now available for the Intellivision.

Also new from Imagic is an undersea battle game called Atlantis, a Donkey Kong-type game called Beauty and the Beast and a game of truly breathtaking graphics entitled Micro-Surgeon.

This last is based on the science-fantasy film Fantastic Voyage in which a submarine was reduced millions of times in size and injected into the body of a top scientist.

In Micro-Surgeon you are that submarine, seeking out and repairing diseased organs.

The talented Activision team have also turned their skills into original games for the Mattel machine. Pitfall — the jungle adventure in which our hero swings across crocodile infested swamps, seeks treasure, and is chased by scorpions and other nasties can now be enjoyed on your Intellivision.

The second Activision game is Stampede. This transforms you into a cowboy on horseback, armed with a lasso with which you must round up the stray cattle.

Coleco have also joined the rush to produce software for Intellivision with versions of their four hottest titles — Donkey Kong, Gorf, Zaxxon and Turbo.

Add to the above all Mattel's own releases and the recent announcement from Parker Brothers that their titles will be available in Mattel format by next July.

It all adds up to much more choice for Intellivision owners in the New Year.



THE SEVEN

A LITTLE GENIUS

A Colour Genie home computer is the prize awaiting our top-scoring Seventh Empire commander.

If you can guide your space tribe to the top profits for this opening game turn of Seventh Empire, you will have earned your reward.

And any supreme space commander would be pleased to map out future galactic campaigns on such a fine piece of modern technology.

Lowe Electronics is hoping the Colour Genie will take over from its popular predecessor.

It offers 16K Ram and 16K of Basic Rom and a full-size typewriter keyboard. Eight vivid colours, high resolution graphics, three channel sound and a 40 × 24 character screen format. It also boasts four programmable function keys and a port for plug-in program cartridges and would cost you £224.50 in the shops.

So whether you want to keep your hand-in playing space invaders between stellar planning for your successful fleets, or would prefer to produce your own program on the likely number of star cruisers to visit Vepos in March, the Colour Genie will provide for hours of entertainment.

So all you need to do is work a little magic on your order sheet perhaps rub the odd lantern and, who knows, a Genie may soon materialise on your doorstep ready to do your bidding.

HELPING US TO HELP YOU

The Seventh Empire is a unique game and it is bound to cause some unique problems. We feel that we have done everything we can at our end to combat these problems but we will need a lot of help from the players.

Time is going to be critical as we must process the orders in time to work out the galactic map for the following issue.

To help with this we will need to be able to easily identify Seventh Empire orders in our post and single them out for processing. Please write **"Seventh Empire Orders"** on the envelope.

We will need to be able to read your orders clearly, so work them out in rough before filling in the coupon in *C&VG*, that way your order sheet will not be plagued by crossings out. And try to write clearly and neatly in block capitals, so that we cannot misunderstand your orders.

Always fill in your own code number as this is a double check on order authenticity. You will find your seven fleets starting positions and your code number on the printout sheet with your rule book. If it is missing, or if the sheet contains the wrong name and address, please ring and let us know.

Remember which of your fleets is where. Fleet 1 will be fleet 1 throughout the game and if you have jumbled your fleets the computer will not accept the moves as legal.

The order form will appear each month (see opposite) with a clear scissors mark and cut-line around it.

Please cut it out as close to the line as possible and try to avoid excessive folding.

The forms are coded by number and colour and we can only accept orders written out on forms cut from the magazine, **not** photocopies or in any other piece of paper.

At our end the game has been designed to eliminate operator error and we are confident that this has been achieved as closely as possible but certain queries and problems may crop up during play. To sort these out we are having a Seventh Empire problem hour every week.

If you have any problems or queries on the game please ring **01-278 6558** between 3pm and 5pm on Fridays. Then we will have the computer up and running and will be able to answer your queries.

Post is both the asset and the bane of play-by-mail games. An asset because it enables games enthusiasts to find other enthusiasts and play against one another. A bane because post is not 100% reliable.

A player can miss out a turn and start again next month without being affected. However, late orders are a cause of misery, especially when you check through the following month's issue and find your moves would have earned top profits. (A bit like winning the Pools after having forgot to post the coupon.)

A deadline date when your orders are needed back, is printed opposite and it is vital that you should post them back in plenty of time to make up for the vagaries of the post.

There's also the danger that you may get your orders in narrowly too late and so believe your fleets to be elsewhere, while they'll actually be lost in space.

Once the computer starts processing it takes many hours for it to come up with the new map and we cannot include late entries. So that deadline date will be final.

YOU CAN STILL ENTER

If you haven't yet entered The Seventh Empire and are tempted by what you see here. Then it's not too late to put your name down to control a space tribe in this massive stellar conflict.

You won't be able to join in this month's competition but we will include your fleets in the following month's game.

Fill in the entry form below and return it to us quickly. The deadline for players wishing to start their Seventh Empire sojourn in March's issue, is the 24th of January.

To enter The Seventh Empire only costs the price of a stamp each month and enters you into an easy-to-play tactical struggle with up to 10,000 other *Computer & Video Games* readers.

We will despatch a 16 page rulebook to you and include you in the next available game turn.

Please include me in the Seventh Empire Competition in March.
I name my tribe:

. . . .

My name is: . . . .
Address . . . .

. . . .

Telephone . . . .

SEVENTH EMPIRE MOVEMENT ORDERS

Key	ORDER	MOVEMENT MODE	CONDITIONS
S	STAY	NONE	None
M	MOVE	TRAVEL	Between empires at peace
T	TRADE	TRAVEL	Between stars of different types and empires at peace
R	RAID	ATTACK	Star of alien empire (phase 1)
R	RETURN	ATTACK	To star of original empire (phase 2)
A	ATTACK	ATTACK	Star of empire at war with original empire
J	JUMP	GATEWAY	To another gateway star
C	CARGO	GATEWAY	To another gateway star
P	PLUNDER	GATEWAY	To another gateway star

The key refers to the computer code for the order but you should write it out in full.

TH EMPIRE

A GALAXY TO CONQUER

Your seven fleets should now be ready to be despatched into the galactic fray. But first the following information will help you plan your campaign through the galaxy, represented by the Galactic Map (right).

The Raid Penalty to be put into your equations for this first turn is "3".

The deadline for orders is **Monday, January 24th**, so don't wait too long before returning them.

Learn to read the Diplomatic Diagram below: a line between two empires means they are at war with one-another. So the Sun Empire can expect attacks from the Bloodline, Amethyst and Pirate Empires this turn. While the Water Empire is only at war with the Dead Empire.

The seven Imperial Ships are not currently shown on this map as no player has had a chance to lay claim to one yet.

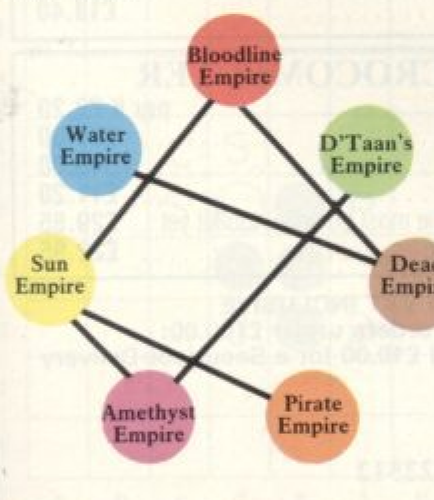
Remember: orders can only be entered on the form below (not photo copies).

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VIZAX ○ 156 0	QIRUS ♥ 153 0	HAZAN ♦ 141 0	ABOB ○ 209 0	SONER * 184 0	VEPOZ ♥ 159 0	QATOT ○ 162 0	HEZOD * 187 0	ASOL * 183 0	SUXEK ♥ 196 0
BAROV * 147 0	WIDAN * 165 0	RURUS ○ 138 0	MUPIP * 153 0	NAXIG ○ 139 0	BETID ♦ 144 0	WAVAB ○ 129 0	RIVEV * 156 0	MEGUD ○ 183 0	NABOK ○ 158 0
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FADIS * 143 0	LOKIK ♥ 177 0	YUSES * 148 0	XAPUS ○ 127 0	IXIP * 194 0	FAGIL ♥ 191 0	LIZAG * 133 0	YODAZ ♦ 162 0	XUGOD * 160 0	IBED ♥ 185 0
VASUX * 160 0	QUXIN ○ 150 0	HIPEB ♦ 171 0	ASOR ○ 172 0	SIDAL ♥ 179 0	VIZET ♦ 161 0	QAVUV * 177 0	HAKUB ○ 167 0	APEL ♦ 159 0	SABAG ♥ 160 0
BUREP ♥ 158 0	WAGAP ♥ 148 0	ROLEK ♥ 159 0	MINEP ○ 132 0	NUVEX ♥ 132 0	BAZIX ○ 141 0	WUPIV ♥ 138 0	RORUL ♥ 172 0	MEDEN ♦ 152 0	NUZET * 160 0
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The Galactic Map

	Star type	*Trade value*
♥	*Elixir*	*200*
♦	*Gem*	*150*
○	*Energy*	*100*
*	*Gateway*	*50*

Star Types



The Diplomatic Diagram

Orders in Block Caps please

Name: ....

Code No: .... Telephone No: ....

	AT	1st Movement phase ACTION	1st Movement phase STAR	2nd Movement phase ACTION	2nd Movement phase STAR
FLEET 1					
FLEET 2					
FLEET 3					
FLEET 4					
FLEET 5					
FLEET 6					
FLEET 7					

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FOR INTELLIVISION

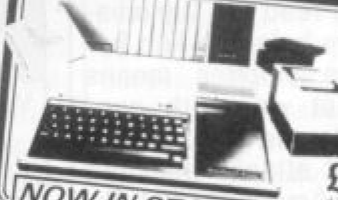
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REVERSI

OPENINGS: *PAIR* EXCELLENCE

The champions of the Reversi (or Othello) board study their adopted game just as thoroughly as the chess and bridge masters.

And this includes noting down classic games between rival champions and building up an opening theory.

Unlike chess where the book of openings is backed up by several centuries of chess publishing, Othello strategy is still a fairly young science and opening theories are not as stable as those in chess.

All of which makes teaching your computer to use the best openings in its first six to eight moves, very difficult.

Chess has a vast store of opening theory which takes white and black into even middle game positions, built on centuries of study and documentation.

Reversi is also building up a wealth of opening theory which consist of a known sequence of moves at the start of a game and continue until one side has a large choice of good replies to choose from.

These openings usually involve filling in some, or all, of the 16 squares which make up the centre of the Reversi board.

By knowing a bit about openings, you instantly increase your chance of winning, and ensure that no-one will brow-beat you into submission early on in the game.

Unlike chess openings, Othello is young enough for openings to change according to whims of great players. So in a computer program you cannot hope to keep abreast of top moves. Better to avoid the worst blunders, then add a strong "random" factor to the rest, so that at least sometimes it plays brilliantly!

Black's first move is forced due to symmetry, so we will choose e3 as in the first diagram. White then has three choices which we have named as follows:- the "Pall" family marked "P" at f5, the "Jerbal" at d3, and the Desert at f3. Top players avoid the Jerbal, though I favour it if White is willing to play outside the centre. So tell the computer to play Desert or Pall most of the time.

Let's now see the general algorithms that help you avoid blunders.

The first rule is one of my basic "rules of thumb" of taking as few pieces as possible, but count the four pieces in the centre as "half" pieces. The second rule is to prefer to complete a "Pair". There are four "Pairs", each being the two adjacent squares to a centre corner, such as the centre sides at d6 and c5 marked "S".

If one square of a Pair is occupied, then the other square is attractive. It often cuts through enemy pieces, which is good play in the middle-game too.

The third rule is to mildly dislike a centre corner if its Pair is empty, to hate a centre corner if its Pair is half-occupied, and to love it if the Pair is occupied. Balance this with previous rule of thumb of course!

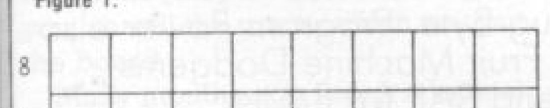
Diagram 2 shows an elegant opening which illustrates the general algorithms well. White plays the Pall at f5, to which Black completes the Pair at e6. White avoids the half-empty Centre corner at f3, so has to play d3. Black completes the Pair at c4.

White could then play at the f6 corner, but Black would reply at c3, so instead White plays d6. Black has an equal choice of Pairs to complete, selecting f4 (c5 being just as good). White takes the cheapest corner, as it is a bit early to play outside the centre. Black again has two equal moves, to complete a Pair at c5, or fill a corner at c3. Black choose c3. White Corner at f3, Black fills Pair at c5, and White completes the shape at c6, as per diagram 2. Black now has only four real choices, as four more are symmetrical, and one gives away a corner. This opening was played by John Parker in the 1981 British Championship to win the final game.

Now look at diagram 3. White played the Desert, Black filled the Pair at f4, White had no choice by symmetry, then Black again filled a Pair at e6, White then played at d3 — taking three pieces.

Why? I don't know. But Maruoka, a world champion from Japan beat many national champions with it. Where would you reply? c4? e2? g4? g5? Confused? Good, because now you know about as much on Othello openings as anyone.

Figure 1.



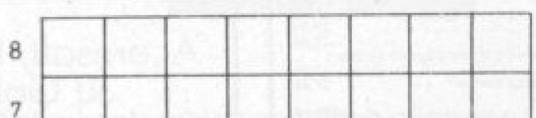
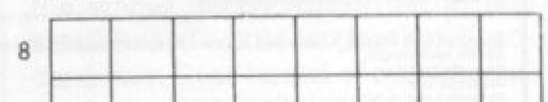


Figure 2.

Figure 3.



jade

AND THE DRAGON



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Projects

MAKING MORE OF YOUR MICRO

Is there life after Kit Korner? The answer from this end is a definite yes. It of course depends on whether or not you are interested in developing new ideas for your computer.

Certainly the technical requirement will not be any more than for the other kits I have already covered. In fact that should be the least of your worries.

You may naturally feel that it is not worth the work involved and decide to buy in a ready built version. In some cases, though, these will not exist, and as I have always said it is far better to build your own as you will learn much faster.

Most of the first few designs I have lined up are based around a single i.c. The reason for this is that they are quite easy to adapt for various micros and are simple to put together.

Later on as I develop new ideas I cannot say what might happen. We will just have to wait and see. As a result of this new expansion there will be far more circuit diagrams and layouts than there have been in the past.

I have always believed that a circuit diagram paints at least a thousand words and is far more informative. Some of the peripheral boards will have some short routines to get you started but the major development will be up to you, as will the use to which you put the board.

Many months ago I took a look at a programmable timer chip, the 6840. I had for a long time wanted to have a go with one just to see what I could manage to do with it. I was pleasantly surprised.

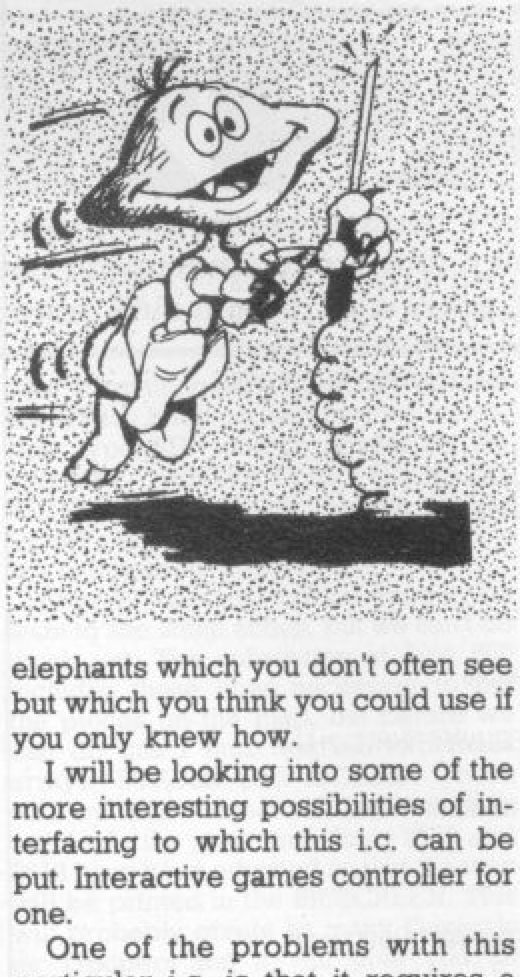
Many of you may already have used interface i.c.s in machine code and fortunately this acts very much like one. It gives you the facility of defining outputs with a certain time lapse or for repeated outputs at set time intervals.

I used the chip first to flash up lights just to see if it would work. Using all three outputs I could get quite a good random flash and flash length with a little logic and some mains relays.

The 6840 is a Motorola i.c. designed for the 6800 system, but will work as well with the 6502 or, with a little help, on any eight-bit machine. It needs machine code to run it or an eight-bit output port in basic or an operator who can use machine code from Basic.

Not everyone will use the same method so I will demonstrate how it works in machine code and then leave it up to you to put the finishing touches to the program. The same goes for the other peripheral boards which I will design for you. You might even like to submit your own versions of the program for scrutiny.

The other i.c. I am interested in developing further is the priority interrupt controller, the 6828. It looks like one of those white



elephants which you don't often see but which you think you could use if you only knew how.

I will be looking into some of the more interesting possibilities of interfacing to which this i.c. can be put. Interactive games controller for one.

One of the problems with this particular i.c. is that it requires a little more software to drive it, so this may be a case for some more instruction than usual.

You may be asking yourself the question, why am I picking 6800 peripheral i.c. projects rather than the more common versions, say 6502 or Z80. Certainly there are just as many i.c.s in their sets as any others.

The main reason is that I have been working for some time on 6800 systems and hopefully know a little of how they work.

Also, 6800 and 6502 peripherals are almost interchangeable. Although Z80s are very common these days for micros they are very flexible in their acceptance of other system i.c.s. This makes the use of 6800 peripherals almost ideal for the job.

If you find any others which you think could prove interesting please do not hesitate to let me know. My articles often spring from other people's ideas.

Another idea I have been working on has been the development of a dedicated microprocessor system which would be capable of fulfilling many purposes but would take very little to build.

If you imagine a basic machine and then write down its components you will only come out with a handful. Processor, ROM, RAM, I/O, display and logic circuits.

What makes a micro so expensive? Well mostly it is the bits you don't use to the full. By dedicating a micro to a particular use you are not wasting anything. Unfortunately you will not be able to use it for very much else unless you change the ROM in it which luckily is not too difficult.

As well as being relatively cheap the whole micro will go on to one small board a little larger than Eurocard size. Ever heard of miniaturisation?

However much work is involved in the projects I will of course be showing you the best and hopefully the shortest cuts to getting your prototype to work well.

I hope also that you will help by sending me your own hints and ideas so that I can pass them on to other readers. It all helps in the learning process, which is what we are here for.

Keith Mott

WARPATH PART II — BITS AND PIECES

```
90 IFK>0THENPOKEL,K:POKEL+1,0:RETURNELSEPOKEL,256+K:POKEL+1,255:
RETURN
260 WD=WD*W2-INT(WD*W2):WN=INT(WD*R3)+1:RETURN
780 DIMH(10),PC(50,2),SV(6),VF(6),RF(6,2),X$(20),D(30),KB(1),KS(
1),KT(1),KV(1),KQ(1),N(1)
800 GOSUB430:W2=997:INPUT"ENTER SCENARIO NUMBER";SC:IFSCTHENWD=S
C*.5284163ELSE800
810 GOSUB430:INPUT"HOW MANY BOULDERS";MT
821 GOSUB5200:GOTO2500    'DELETE LATER
860 RETURN
950 H(1)="ABC":H(2)="DEF":H(3)="GHI":H(4)="JKL":H(5)="MNO"
960 C5="ABCD"
970 RESTORE:FORI=1TO2:FORJ=1TO6:READK:RF(J,I)=K:K=K-256*(K<0):PO
KERW,K:RW=RW+1:NEXTJ,I
980 RESTORE:L=27544:FORI=1TO12:READK:GOSUB90:L=L+2:NEXT
990 L=27532:FORI=1TO6:READVF(I):K=VF(I):GOSUB90:L=L+2:NEXT
1000 D(2)="ABC":D(3)="DEF":D(4)="GHI":D(5)="JKL"
1010 D(7)="ABC":D(8)="DEF":D(9)="GHI":D(10)="JKL"
1020 D(12)="ABC":D(13)="DEF"
1030 D(14)="GHI":D(15)="JKL"
1040 D(17)="ABC":D(18)="DEF"
1050 D(19)="GHI":D(20)="JKL"
1060 C3="ABCD"
1070 C4="333221111333221111333221111444321111444431111555556111555
5555611555555561555555556"
1080 GT="ABCDEFGHIJKLMNOPQRSTUVWXYZA"
1090 T$="...TROOPERS":I$="INDIAN":E(0)="DEFENDER":E(1)="ATTACKER
":E(2)=" ELIMINATED":D=D(5):RETURN
1120 FORV=10TO16:POKEI,195:GOSUB440:U=I+1:P=X:GOSUB190:I=I+4:NEX
T
1130 V=16:GOSUB440:B7=X:POKEI,195:U=I+1:P=X+9:GOSUB190:I=I+3
1150 V=4:GOSUB440:B4=X:U=X+36:P=S9+1:GOSUB190
1180 DATA-24,24,48,23,-25,-48, -23,25,48,24,-24,-48,-60,68,128,6
0,-68,-128
2510 IFML>2000THENPRINTH(RND(3));
2512 IFML<1700THENPRINTH(RND(2)+3);
3099 DATA CHARACTERS
3100 DATA 158,148,094,158,148,135,171,142,148
3110 DATA 190,148,128,176,181,144
3120 DATA 184,159,175,180
3121 DATA 156,148,128,152,144,128,144,144,128,128,128,128
3122 DATA 170,140,148,170,140,148,168,184,144,160,160,128
3123 DATA 188,148,128,184,144,128,176,144,128,128,128,128
3124 DATA 176,180,144,160,180,128,160,176,128,128,128,128
3129 DATA 152,185,182,164
3130 DATA 143,143,143,143,140,140,140,140,143
3140 DATA 191,191,128,128,128,128,128,128,191
3150 DATA 191,143,140,140,140,140,140,140,188
5198 '
5199 'GRAPHIC LOADER
5200 CLS
5205 RESTORE
5206 READM$:IFM$<>"CHARACTERS"THEN5206
5210 FORI=1TO5
5220 X=PEEK(VARPTR(H(I))+2)*256+PEEK(VARPTR(H(I))+1)
5230 A$=H(I):GOSUB5400:NEXTI
5231 X=PEEK(VARPTR(C5)+2)*256+PEEK(VARPTR(C5)+1)
5232 A$=C5:GOSUB5400
5240 FORK=2TO17STEP5
5250 FORI=KTOK+3
5260 X=PEEK(VARPTR(D(I))+2)*256+PEEK(VARPTR(D(I))+1)
5270 A$=D(I):GOSUB5400:NEXTI,K
5280 X=PEEK(VARPTR(C3)+2)*256+PEEK(VARPTR(C3)+1)
5290 A$=C3:GOSUB5400
5320 X=PEEK(VARPTR(GT)+2)*256+PEEK(VARPTR(GT)+1)
5330 A$=GT
5400 FORJ=1TOLEN(A$):READM:POKE(X+J-1),M:NEXTJ:RETURN
```

WARGAMES need opposing forces, armed and ready for battle. In Warpath the conflict is between the cavalry's General plus his troopers and the three types of Indians: those armed with tomahawks, the bowmen and the horsemen.

The conflict must be carefully balanced to give both sides an equal chance of victory and this is achieved by different numbers of each piece with various movement and attack/defence advantages.

In wargames like chess, there is no problem with preserving a balance in the game as both sides are made of the same pieces in the same position.

This leads to chess experts being able to develop rigid opening formations which have been proved and used many times before.

Warpath sets out two very different looking sides which will be in a new formation each time you come to play the game.

Remember: if you have any difficulty following Warpath on your computer please write in and let us know.

By the way, the machine language is written in Z80 code. I would like to hear from anyone who successfully implements the program in 6809 or 6502 code. There are no ROM calls.

The Warpath game pieces are as follows:

		Number	Movement	Attack/ Defence
Field	Troopers	14	3	1
	General	1	4	2
	Flag	1	See below	0
Garrison	Troopers	9	3	1
Indians	Bowmen	8	3	0
	Tomahawks	8	4	0
	Horsemen	8	6	1

When the board is set up, the Flag will be in the hex occupied by the General. Any piece occupying the Flag hex will receive an extra movement factor provided that it is in that hex at the start of its move. A trooper who is adjacent to the General receives an additional attack/defence factor.

Last month we developed the BIG-SCREEN routines for WARPATH; now let's look at the creation of the pieces. The method is similar to the machine language routines but this time we build up graphic characters.

Characters can be created using the CHR$ instruction. For example: a man H(1), could be defined as:
H(1)=CHR$(158)+CHR$(148)+CHR$(094)

But this takes up 20 bytes of memory. (Count it. Remember that CHR$ only occupies one byte.) Lines 3100 to 3150 contains 98 items of DATA so if we use this method it would probably cost about 650 bytes. If we POKE the data into strings, however, it will require no more than the length of the strings defined in lines 950 to 1080 (excluding 1070), i.e. about 150 bytes — a saving of 500 bytes. It was only by adopting these methods that I was able to fit this game into 16K.

Incidently, whilst on the subject of byte-grabbing, let us look at line 1070. This contains C4 which is a table of ODDS with 81 numbers none of which is greater than 6. I could have defined an

WARPATH

Lead the cavalry charge or plan the Indian ambush. Part II of Ron Potkin's series which combines advanced programming tips with a listing which builds into a thrilling wargame. This month, Ron looks at the pieces.

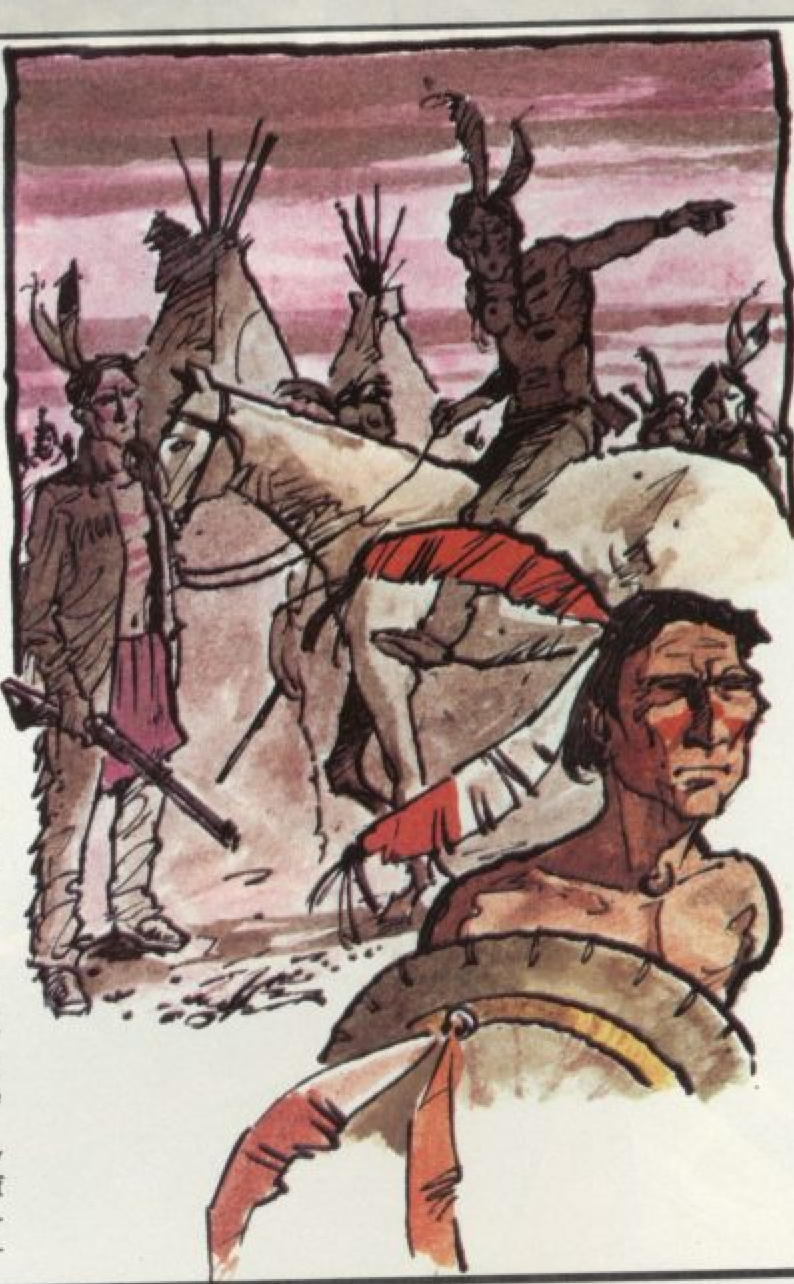


Illustration: Jon Davis

integer table and put the numbers into that, but this would have required two bytes per number and, in addition, I would have needed more DATA lines and the necessary programming to set the table up.

I estimate an extra 200 bytes would have been needed to do this, quite apart from the additional time delay. Accessing the string is done using MID$ and VAL. You should always look for these savings.

Full marks if you have seen that I could have made the table smaller by putting 3 numbers in one byte (because 6 to the power of 3 is less than 255, the capacity of one byte).

Now back to the pieces. There are several different types:

1 The men are represented by the variables H(1) to H(5).
2 Boulders are held in C3 and the Headquarters piece is held in C5.
3 A major part of the Fort is in GT.
4 D(2) to D(20) are the elimination routines and operate like a filmstrip. I find explosions very difficult to define authentically, so in these sequences I push the man into the ground!

The TRS-80 graphics are very simple. The video has 16 rows of 64 blocks and each block contains 6 pixels numbered as follows:

1	2
4	8
16	32

To this you must add 128. H(1) — the bowman is made up of 158 and 148, i.e.

·	2	·	·
4	8	4	·
16	·	16	·

CHR$(094) is an East pointing arrow. Many computers do not have this character — I suggest you replace this with the "Greater than" sign (ASCII 62).

Before you start typing, LOAD the program from last month. Now add the Basic listing below. This contains a graphic loader. Make sure you type lines 950 to 1080 exactly as they appear. You should also type the change in Line 821.

Make sure you save the program before running it; there are several POKE and you easily ruin it with a wrong instruction. Incidentally, always save the updated listing onto a new tape. If anything does go wrong you can always fall back on the previous month. Now type RUN and in answer to the questions, "ENTER THE SCENARIO NUMBER" and "HOW MANY BOULDERS?", type any low number — these are unimportant at present.

After all that hard work, I expect you want to see some action, but we can't do much yet. The subroutine at Line 860 includes those lines necessary to put the pieces on the map, but before we can do this I must explain two more arrays, PTABLE and IBOARD. These will be the subject of next month's article. In the meantime, lines 2510 and 2512 have been adjusted so that the men will be printed in the BIGSCREEN. This will probably create as many Generals as Troopers but it will give you an opportunity to see the results of your efforts.

Line 780 dimensions all arrays. Make sure you include even the small ones, KB, for example, only uses KB(0) and KB(1), i.e. 4 bytes. You can save about 12 bytes by using the DIM statement.

Line 790 asks for a scenario number. All my games have their own random number generator which is seeded with this number. This enables players to replay the same map layout, either because they wish to reverse sides and play under the same conditions or because they discover a particularly interesting set up. The seed, WD, is calculated from the scenario number. When a random number is needed between, say, 1 and 6, R3 is set to 6 and the generator, line 260 is called. The variable, WN, returns the random number and WD is reseeded. Note that W is defined as Double Precision. Once the board has been set up, I use the Basic random number generator to determine the outcome of attacks.

We now call the initialising routine at 1100. Lines 1100 to 1160 prepare the machine code routines by setting up the JUMP table (variable RU).

Do you find this table confusing? Some of the routines call subroutines just like GOSUB in Basic. For example, the routine in X$(1) calls X$(2). Strings, however, tend to move around in memory during program development and therefore the address of X$(2) will change. Although I can calculate this and POKE it into X$(1), I risk poking either a zero or 34 into the Basic line which would ruin the program. Instead I have created a table whose address is fixed and which can never contain 0 or 34. The address of X$(2) is poked into this together with a JUMP instruction. This enables X$(1) to call the table which in turn jumps to X$(2).

The problems with zero and 34 occur with the TRS-80 using Microsoft Basic. Zero is used to signify to the interpreter the end of a Basic line and 34 is the quote character signifying the end of a string. Other computers using different interpreters may vary. On the ZX81 the number to avoid is 76.

I have created variables which are entry addresses to the USR routines, i.e.

B1 — X$(1) address for BIGSCREEN.
B4 — X$(4) address for SEARCH.
B7 — X$(16) address for RANGE.

X$(3) is the CLEAR routine. It is used in Line 1160 only. Next month we will examine PTABLE and IBOARD.

Two more spell-binders from



NEW SCHIZOIDS

for any ZX SPECTRUM.
It's my own fault, I even volunteered.
I thought that with the space-dozer and its shovel and skyhook it would be easy shifting the galaxy's rubbish. Childs play. HUH!
They warned me of the weird packaging, the trays, the rods, and all the rest.
But they didn't say I'd have to stop and control not just one but two or even more garbage pods. Then prod them, push them, toward that black hole, and oh, it's so very, very black, and so lonely, so empty.
Panic, musn't panic, but they won't stop, twirling and spinning and turning, always turning, towards me, against me, at me.
And I'm alone.
No way out, nowhere to hide, on my own, my own . . own . . . .
SCHIZOIDS: NOT JUST A GAME, BUT A STATE OF MIND.

SCHIZOIDS features real-time animated 3d graphics for a breathtaking visual experience, plus sound and all those arcade features you'd expect from IMAGINE.
Game design and Software by Peter Paranoid and the Yid Kids. (D.H.L.)

NEW WACKY WAITERS

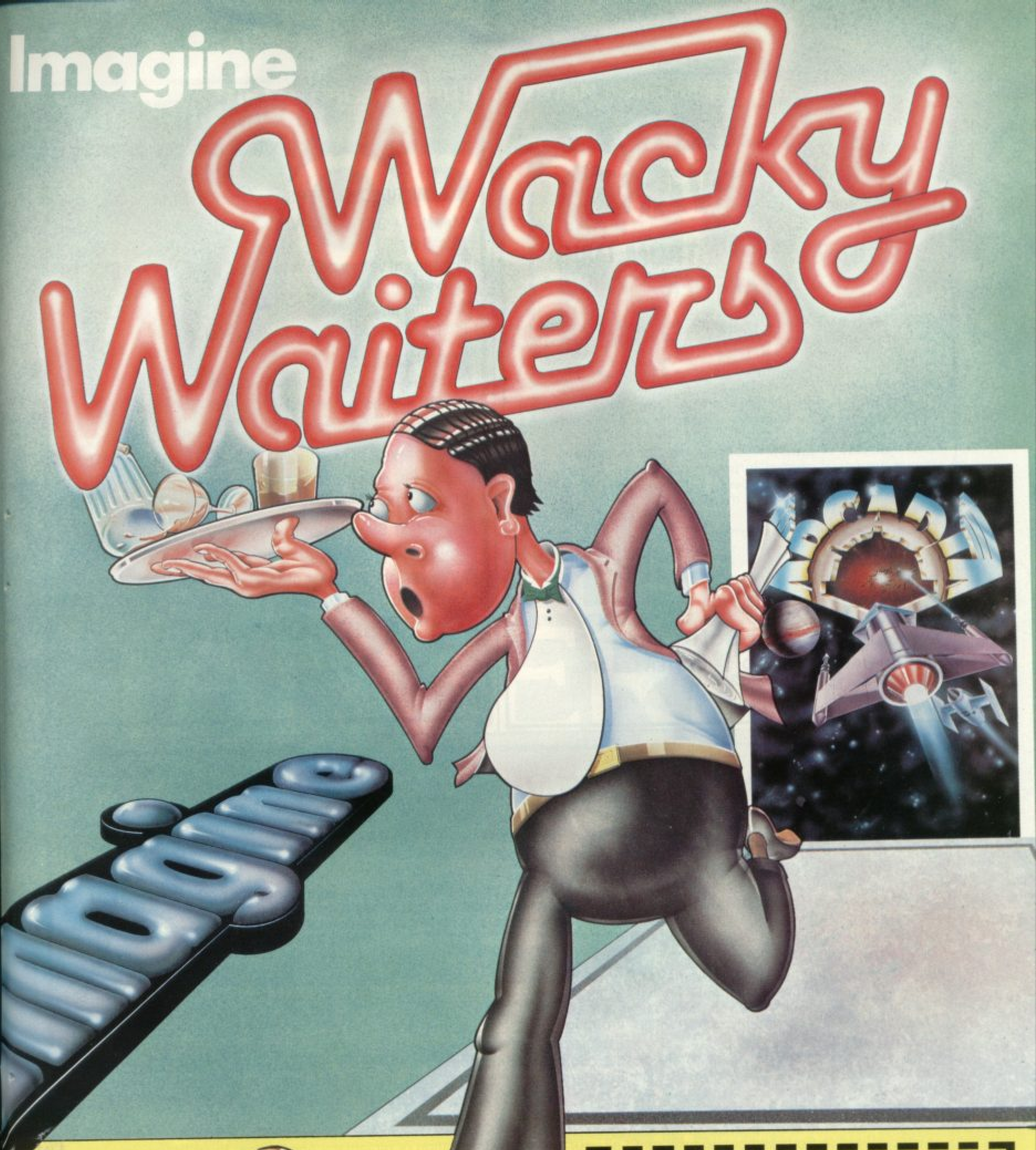
the wildest, zaniest way of earning a fast buck. With crazy guests screaming for service you're gonna have to be quick to pick up the tips, don't slop the drinks, as you dodge the drunks and dart from elevator to elevator, coz if the Boss man spots you, your gonna be out on your but.
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REVIEWS

BOLDLY GOING WHERE OTHERS FEAR TO TREAD

STAR RAIDERS

Star Raiders was generally acknowledged as being a "state of the art" computer game when it was launched last year.

This jargon term simply means that in terms of quality of graphics, playability, and game development the cartridge is the best that present technology has produced.

The game puts you in the cockpit of an Atarian Federation star cruiser chasing the enemy Zylons through space.

By pressing a button on the computer keyboard a map of the galaxy is displayed. This shows the position of enemy ships and star-bases in relation to your craft.

There are three types of ships to be dealt with. Zylon Fighters are designed for high-speed attacks and can be deadly at close range.

Zylon Cruisers have assigned patrol routes within certain sectors and will only attack if provoked. Basestars can only be destroyed at close range. Use extreme caution when attacking a Basestar.

As well as enemy ships you will also have to avoid the masses of meteorites that are spinning through space.

To aid you in your mission you have a number of sophisticated battle and flight control instruments. Computer Attack Control flashes up gun sights on the screen and enables you to lock on your photon torpedoes, but the Galactic Chart is your most useful aid in your pursuit of the Zylons.

This shows you the entire galaxy divided into sectors containing either enemy starships, friendly starbases, or are completely uninhabited.

The Hyperwarp enables you to travel at accelerated speed to different sectors and the long range scan shows you the positions of approaching enemy fighters.

You can work your way up through the ranks of the star fleet while you play. Some of the ranks will amuse you.

Once this has been achieved the real fun can begin as you work your way up through the ranks from rookie to Star Commander. The good thing about the game is that it is pretty tough to win this top rank rating.

Star Raiders is available from most good Atari dealers at £29.95. Not cheap — but an excellent addition to your games library never the less. It runs on an Atari 400 and 800 with version also available for the VCS.

- **Getting started** 9
- **Value** 7
- **Playability** 8



BEWARE OF THE DEADLY BALROG

SORCERERS ISLAND

Once marooned on Sorcerers Island your only hope is to find the hidden escape route.

Numerous hidden beasties will try to stop you and take your life during your quest for the lost exit. Some are easy to deal with — but the dreaded Balrog will show no mercy.

You start this adventure with 2,000 life points which decrease as you battle with various monsters to collect the treasures you find along the way.

After each move you are a map of the island is available for your perusal — and you can also check out the spaces immediately next to your present position. Unfortunately neither show the exit or the monsters.

Sorcerers Island is one of two adventure games for the ZX81 from Psion.

The other — which also requires 16K to run — is Perilous Swamp. This is the easier of the two games. you have to rescue a princess from an evil wizard. There are more monsters and lots of action. I recommend you try Perilous Swamp first — I've yet to solve Sorcerers Island. If you like adventure games then this cassette is well worth the price of £4.95.

- **Getting Started** 7
- **Value** 7
- **Playability** 7

BUGGIES WILL SIMPLY DRIVE YOU CRAZY!

BAJA BUGGIES

This is very much like the VCS game Night Driver. But Gamestar, the new American Atari software company who released this new game have made full use of the superb graphics of the Atari computers.

The scene is set in the Californian desert. Sand-dunes lurk at the top of the screen with a golden sunset on the horizon.

The object of the game is to win the race. But as you start last there are 80 buggies in front of you! Your speed accelerates automatically and when you press the fire button your brakes go on. You have to slow down or you will lose control.

At the bottom of the screen there is a control panel. This shows your speed, your position in the race. There's a radar scan which shows how far you are from the finish line. The radar also shows where the leaders are.

If your averege speed is better than the speed already on the scoreboard you get a chance to put your initials up. If you wish to join the Baja Buggies Club you must take a photo of your initials to the manufacturers. In return they will send you a key-ring and membership card.

One of the annoying things with the game is that if you crash your buggy too often or go off the road too often your buggy will break-down and the game is over. Graphics wise buggies could be better. The sounds are also pretty poor in comparison with games like Preppie.

This 16K game for the Atari 400/800 was good fun to play but overall it was rather disappointing. Baja Buggies is available from Gemini Electronics of Manchester at £19.95.

● **Getting Started**	6
● **Value**	7
● **Playability**	6

DINING OUT WITH THE GHOSTS

SPECTRUM PACMEN

A stack of Pacman-type games have been cluttering up the *C&VG* reviews office over the last few weeks. A new maze gobbling game is added to the list of software available for the Spectrum at the rate of about one a week.

We tested a batch of the more obvious straight copies of the arcade original.

First on the screen was Spookyman from Abbex Software of London.

This game got off to a bad start as it did not tell me which keys to move my little man around the maze. A prime consideration in this game!

Although the maze looked fairly good the Pacman somehow failed to convince. It just didn't feel like controlling a little chap with a personality of his own.

Having just borrowed an Atari 400 with a Pacman cartridge I was used to much better player involvement in the game.

If you got caught by one of the ghosts the game paused for an annoyingly long period. There is also an absence of shrinking and gobbling sands and the characteristic gulp, gulp, gulp as you clock 200 then 400 and 800 in the arcade original.

Next up was Mazeman from Abersoft of Dyfed. This was the fastest and most playable of the pile but this too left a little too much to be desired.

The game produced no sound effects, bonus fruits or flashing ghosts.

All of the games would have been greatly improved by the use of a joystick. Playing Pacman without a joystick is rather like Blackpool without the illuminations.

Based on Pacman but with a few twists of its own was Gulpman from Campbell Systems of Essex. This game offered thorough instructions with a comprehensive list of game options.

You could choose one of fifteen mazes and vary the speed of your little man and the chasers.

Another interesting variation on the basic Pacman theme was a laser-gun with a limited amount of energy with which you could shoot the chasers.

On the minus side Gulpman has pretty basic graphics. The Gulpman for example moves around the maze without moving his legs. It would have been more convincing had the program simulated some sort of running motion.

Artic Computing of Hull also produce a Pacman-type game called Gobbleman, which I believe is a fairly close copy of the arcade game. I cannot give you my comments on this game however as it steadfastly refused to load on my Spectrum.

I was not over impressed with any of these versions. I don't know if it's the software or the machine but frankly Spectrum Pacman is not a patch on its Atari and BBC model B counterparts.

But if you really want a Pacman for your Spectrum, Gulpman just pips Mazeman. You might be better advised going for some of the original maze chase games.

	Spookyman	Mazeman	Gulpman
● **Getting started**	6	8	9
● **Value**	5	6	6
● **Playability**	4	5	7

continued on page 114 ▶

missile panic



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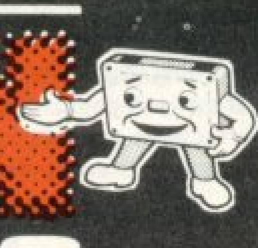
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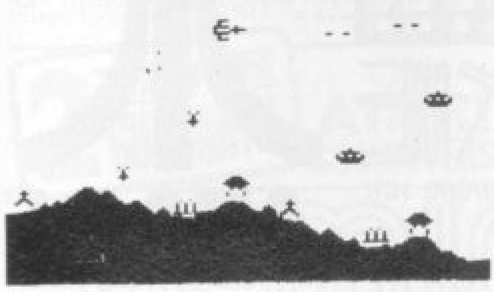
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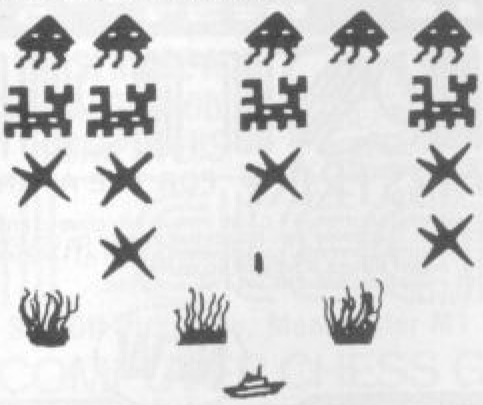


"A real action shot of the game"

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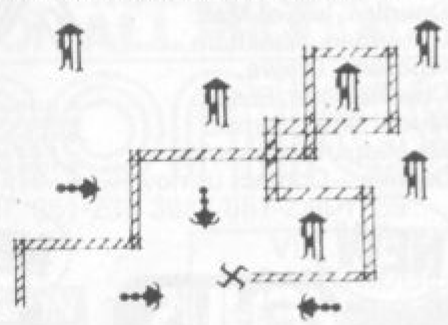
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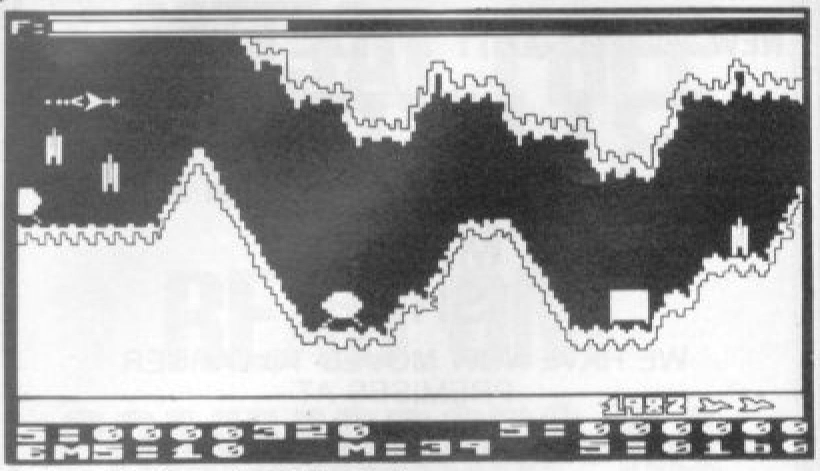
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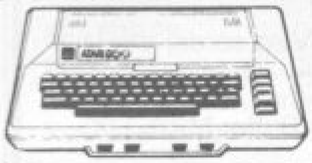
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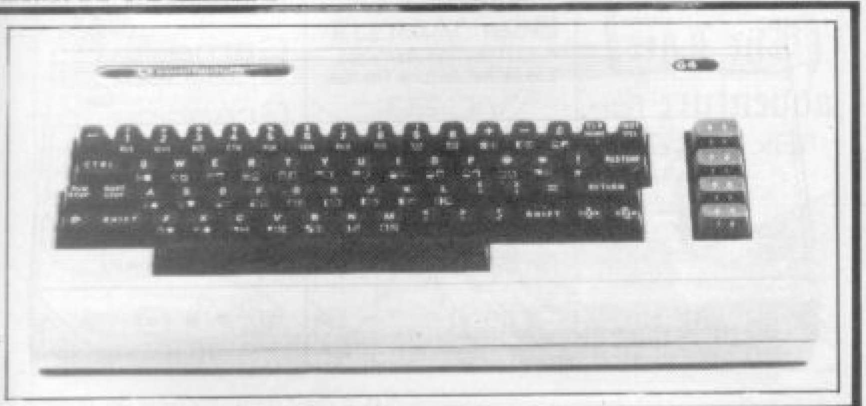
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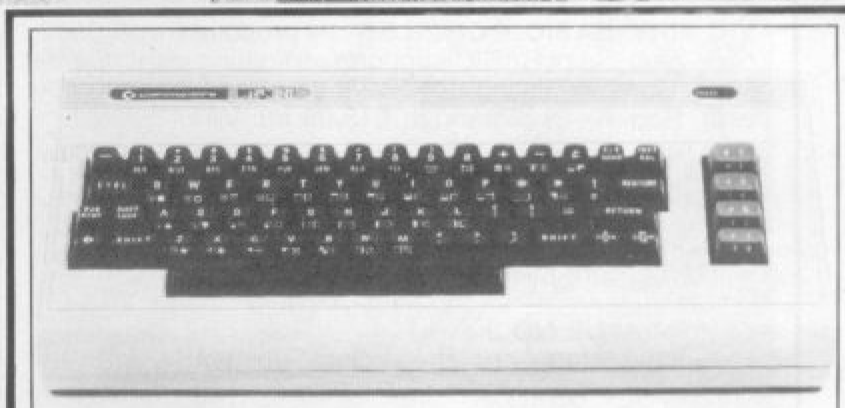
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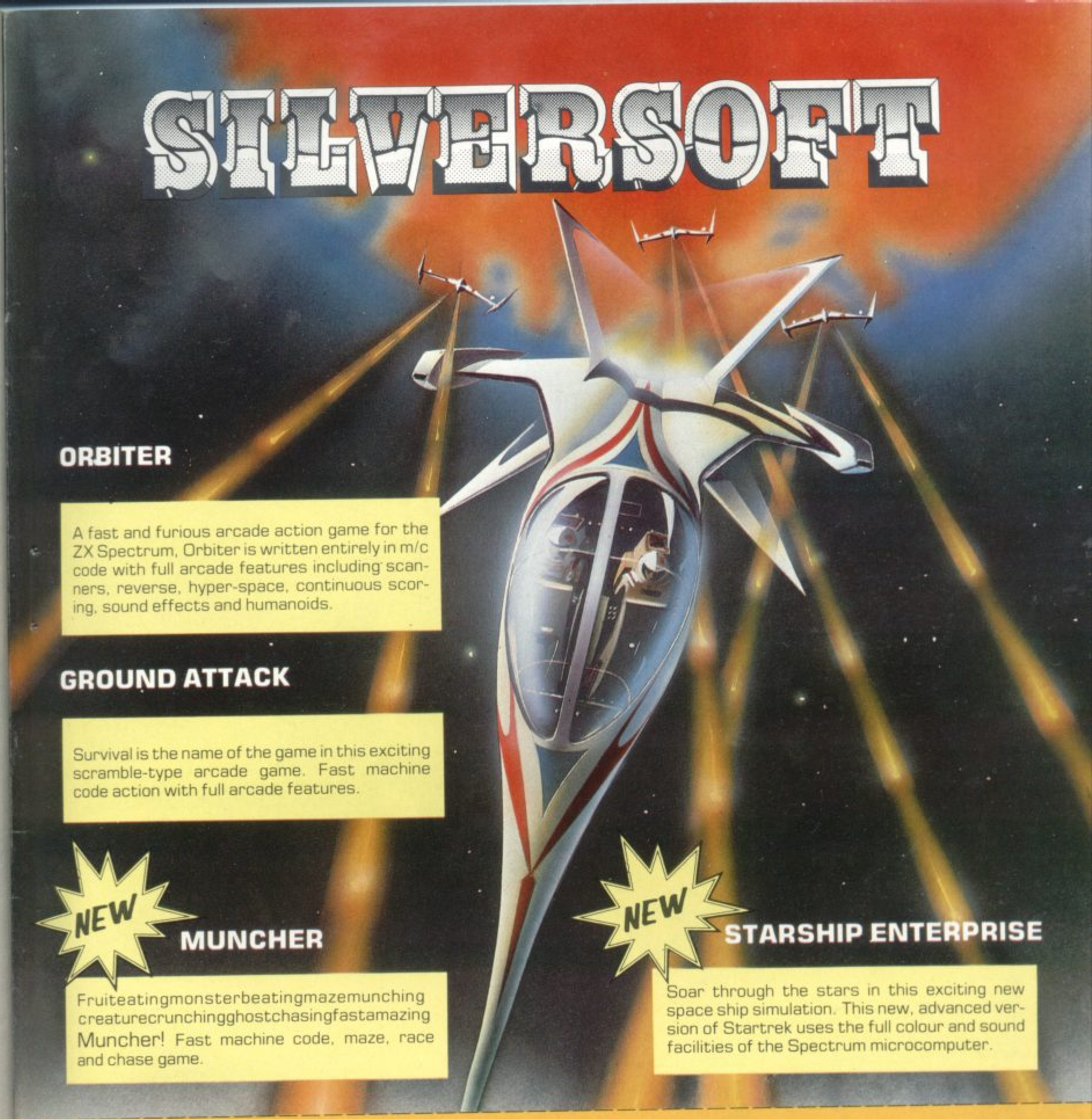
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